Typewriter

2-48
Lites

# Service Manual

# IBM Wheelwriters

typewriter

Wheelwriter

Wheelwriter 5000

6783-2

LEXMARK

**Second Edition (November 1994)**

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## Safety Information

- The maintenance information for this product has been prepared for use by a professional service person and is not intended to be used by others.
- There may be an increased risk of electric shock and personal injury during disassembly and servicing of this product. Professional service personnel should understand this and take necessary precautions.
- The safety features of some parts may not always be obvious. Therefore, replacement parts must have the identical or equivalent characteristics as the original parts.
- When you replace a lithium battery, exercise
**CAUTION: Danger of explosion if lithium battery is incorrectly replaced. Replace only with the same or equivalent type lithium battery. Do not recharge, disassemble, or incinerate a lithium battery. Discard used batteries according to the manufacturer's instructions and local regulations.**

## Sicherheitshinweise

- Die Wartungsinformationen für dieses Produkt wurden zur Verwendung durch einen Wartungsfachmann entwickelt und sollten nicht von anderen benützt werden.
- Zusätzliches Risiko eines elektrischen Schlags und körperlicher Verletzung existiert während des Auseinandernehmens und der Wartung des Geräts. Fachpersonal sollte im vollen Verständnis der Lage entsprechende Vorsichtsmaßnahmen ergreifen.
- Ersatzteile müssen gleiche oder gleichwertige Merkmale wie die Originalteile aufweisen, da Sicherheitsvorkehrungen nicht immer offensichtlich sind.
- Wenden Sie beim Austauschen einer Lithiumbatterie besondere
**VORSICHT an: Explosionsgefahr, wenn die Lithiumbatterie nicht ordnungsgemäß ausgetauscht wird. Ersetzen Sie die Batterie nur durch eine Lithiumbatterie gleichen oder gleichwertigen Typs. Laden Sie die Lithiumbatterie unter keinen Umständen neu auf, nehmen Sie sie nicht auseinander und verbrennen Sie sie nicht. Vernichten Sie verbrauchte Batterien laut Anweisungen des Herstellers und in Einklang mit gültigen Vorschriften des Landes.**

## Consignes de Sécurité

- Les consignes d'entretien et de réparation de ce produit s'adressent uniquement à un personnel de maintenance qualifié.
- Le démontage et l'entretien de ce produit pouvant présenter certains risques électriques, le personnel d'entretien qualifié devra prendre toutes les précautions nécessaires.
- Les normes de sécurité de certaines pièces n'étant pas toujours explicites, les pièces de rechange doivent être identiques ou conformes aux caractéristiques des pièces d'origine.
- Remplacement de la pile de lithium :
**ATTENTION : Danger d'explosion si la pile utilisée pour remplacer la pile de lithium n'est pas du même type. Ne pas recharger, démonter ni brûler une pile de lithium. Veuillez suivre les recommandations du fabricant et la législation en vigueur concernant les piles usées.**

## Norme di sicurezza

- Le informazioni riguardanti la manutenzione di questo prodotto sono indirizzate soltanto al personale dell'assistenza autorizzato.
- Durante lo smontaggio e il manutenzionamento di questo prodotto, è possibile il rischio accresciuto di scosse elettriche e danni personali. Il personale di assistenza autorizzato, consapevole di ciò, deve adottare le precauzioni necessarie.
- È possibile che le funzioni di sicurezza di alcuni elementi non siano così ovvie, quindi, i pezzi di ricambio devono avere caratteristiche identiche o equivalenti a quelle dei pezzi originali.
- Quando si sostituisce una batteria al litio, considerare il seguente avvertimento:
  **ATTENZIONE: Pericolo di esplosione se la batteria al litio viene sostituita in modo non corretto. Sostituirla con un tipo di batteria simile o equivalente. È vietato ricaricare, smontare o incenerire una batteria al litio. Disfarsi delle batterie usate secondo le istruzioni del costruttore e le norme locali.**

## Pautas de Seguridad

- La información sobre el mantenimiento de este producto fue escrita para el personal de mantenimiento cualificado y no para cualquier otro usuario.
- Existen mayores riesgos de descargas eléctricas y daños personales durante el desmontaje y la reparación de la máquina. El personal cualificado comprende esto y toma las precauciones necesarias.
- Los dispositivos de seguridad de algunas partes quizá no siempre puedan ser reconocidas a simple vista. Por lo tanto, las partes de reemplazo deben poseer características idénticas o equivalentes a las partes originales.
- Cuando cambie una pila de litio, hágalo con
  **PRECAUCION: Existe el peligro de explosión si se reemplaza incorrectamente la pila de litio. Cámbiela solamente por el mismo tipo de pila de litio o uno equivalente. No vuelva a cargar, desmontar, o incinerar una pila de litio. Deshágase de las pilas usadas siguiendo las instrucciones del fabricante y las normas locales.**

## Sikkerhedsoplysninger

- Oplysningerne om vedligeholdelse af dette produkt er forberedt med henblik på professionelt servicepersonale, og bør derfor ikke benyttes af andre.
- Risikoen for elektrisk stød øges under demontering og service af dette produkt, hvorfor der bør tages de nødvendige forholdsregler.
- Sikkerhedsforanstaltningerne er ikke altid lige åpenbare for alle reservedele. Der bør derfor kun anvendes originale reservedele eller reservedele med samme egenskaber som de oprindelige.
- Når du erstatter et lithiumbatteri, skal du være
  **FORSIGTIG: Der kan være fare for eksplosion, hvis lithiumbatteriet ikke isættes korrekt. Der må kun udskiftes med et lithiumbatteri af samme slags eller et med lignende egenskaber. Et lithiumbatteri må ikke genoplades, demonteres eller brændes. Følg fabrikantens anvisninger og lokale regulativer med hensyn til afskaffelse af brugte batterier.**

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# General Information

This chapter contains general information about the contents of this maintenance information. The text that follows describes each chapter and, in some cases, explains how to use the information in the chapter.

You will find a list of the tools and test equipment you will need to service this machine at the end of the chapter.

## Chapter 2. Diagnostic Information

The diagnostic information contains the procedures you will use to diagnose and isolate product failures. Diagnostic information consists of:

Start
Maintenance Analysis Procedures (MAPs)
Diagnostic Aids

- START MAP: This MAP is the starting point for any diagnostic action. Based on high level symptoms, the information in this MAP will direct you to more detailed procedures or actions. The detailed procedures will help you resolve the machine failure.
- MAINTENANCE ANALYSIS PROCEDURES: When Start sends you to a MAP, go to that page and perform the steps as instructed. If there are any notes or instructions at the top of the page you must read them before you start the procedure.

  Carefully read each step of the MAP and perform the appropriate action as instructed. If you do not remember the location of a specific part or test point, or if you do not remember an adjustment or removal procedure, see the chapter that has that information. Always return to the MAP after you do this. In some cases you will be sent to other MAPs to find the failure.

  *Failing Parts or Assemblies* - The MAPs will generally help you diagnose a problem to one part or assembly. The last step of the specific MAP you are using will indicate a part or assembly is failing. You should inspect the part or assembly before you decide to replace it. It may only be loose or dirty or need only a small repair. The MAPs may lead you to 2 or even 3 possible failing parts or assemblies (Figure 1). The parts that may be failing are listed in order of the most probable failure. In the example shown below, the printer board is most probably the cause of the problem.

  |
  The Printer Board is failing.
  — or —
  The Function Board is failing.

  Figure 1, Failing Parts or Assemblies

  *Measuring Voltages* - Many of the diagnostic procedures instruct you to measure voltages on cable plugs and electronic board connectors. If you are asked to measure voltage at several places on a plug or connector, a chart next to or near the question will indicate the number of the plug or connector, the pin numbers you should measure, the signal name, and the correct voltage for the condition you are measuring. Measure the voltage only at the pins listed in the chart. A ground point may be specified. If the ground point is not specified, use the frame ground strap on the left or right side of the frame.

  Remember to set your meter on the correct scale and put the meter leads in the correct position for the voltage you are asked to measure.

  *Matrix Diagnostic* - When there could be multiple symptoms for a failure, or multiple failures that could cause the same symptom, you will be sent to a matrix diagnostic (Figure 2). In general, the matrix diagnostic will help you locate mechanical failures. In some cases you will be sent from the matrix to an electrical diagnostic if there is no mechanical failure. The left side of the matrix lists the symptoms. The right side of the matrix, lists the FRUs in the order you should check them. The FRU most probably causing the indicated symptom is placed first in the sequence. The letters in the matrix send you to the part or assembly you need to check. These parts and assemblies are listed in the FRU CHECK procedure directly below the matrix.

| SYMPTOM | 1 | 2 |
|---|---|---|
| Printwheel does not rotate, is noisy, or its speed changes as it rotates. | B | A |
| Typewriter malselects, splits characters, or makes print hammer marks. | B | A |
| Carrier drives against right side frame. | A | B |
| Print Hammer does not energize | A | B |

| | FRU | CHECK FOR |
|---|---|---|
| A | Selection Plate Assembly | Motor: Binds, loose screws, and loose connector<br>Hub: Bent, broken, or loose<br>Hammer: Binding or excessive end play If the hammer solenoid does not energize, Go to "MAP 0240: Print Hammer Electrical" on page 2-70.<br>For electrical failures, Go to "MAP 0290: Selection Electrical" on page 2-96. |
| B | Printwheel | Binds, broken or missing bias spring, broken cartridge, bent printwheel petals<br>For electrical failures, Go to "MAP 0290: Selection Electrical" on page 2-96. |

Figure 2, Matrix Diagnostic.

- DIAGNOSTIC AIDS: This section contains information outside the diagnostic procedures to help you diagnose a failure of a specific part. Some diagnostic aids are resident in the machine. This section also contains the Power on Sequence (POR) of the machine. The machine performs the POR each time it is turned on. You will use this information throughout the diagnostic procedures. You should become familiar with the POR and be able to determine if the machine performed all the steps.

## Chapter 3. Repair Information:

This chapter contains:

Adjustments
Removals and Replacements
Packaging/Handling Procedures

## Chapter 4. Parts/Test Point Locations:

This chapter is useful when you are asked to measure voltages. Use this information to help you locate parts such as electronic boards, connectors, pin numbers and test points.

## Chapter 5. Preventive Maintenance:

This chapter contains the Lubrication Guide for this machine.

## Chapter 6. Safety Inspection Guide:

Use this information to inspect a machine for safety problems before putting the machine under a Maintenance Agreement.

# Tools And Test Equipment

Meter readings in this manual were taken with an IBM® meter, P/N 9900167.

The following tools should be used to service this machine.

| Tool | Part Number |
|---|---|
| 6" Metal Scale | 0450158 |
| Push-Pull Scale | 0460870 |
| 3/16" x 6" Flat Blade Screwdriver | 1650853 |
| 5/16" x 6" Flat Blade Screwdriver | 1650856 |
| 3" Small Screwdriver | 9900070 |
| 7mm Open End Wrench | 1749242 |
| #1 SUPADRIV[1] Screwdriver | 4760541 |
| #2 SUPADRIV Screwdriver | 4760542 |
| #1 SUPADRIV Screwdriver, insulated | 4056724 |
| #2 SUPADRIV Screwdriver, insulated | 4056726 |
| 5/16" x 1/4" Open End Wrench | 9900005 |
| Large Springhook | 9900059 |
| Medium Screw Starter | 9900060 |
| Large Screw Starter | 9900328 |
| T-Bender | 9900094 |
| Analog or Digital VOM (Triplett[2] 310C or equivalent) | 9900167 |
| 3/8" x 7/16" Box End Wrench | 9900182 |
| Large Screw Starter | 9900328 |
| Feeler Gauges | 1749245<br>or<br>9900468 |
| ESD Handling Kit | 6428316 |
| ESD Wrist Band, Small | 6428167 |
| ESD Wrist Band, Large | 6428169 |
| IC Module Extracting Tool | 9900764 |

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[1] SUPADRIV is a registered trademark of GNK and Fasteners Limited.

[2] Triplett is a trademark of the Triplett Corporation.

# Diagnostic Information

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Notes

## MAP 0100: Start

Use the MAPs in this chapter to diagnose failures in the Wheelwriter® 10, 15, 30, 35, 50, 70, 1500, 3000, 3500, 5000, and 7000 typewriters.

**Note:** Later level machines have a single function board rather than a separate motor control board and the function board. Some steps in the MAPs require that you identify which machine you have. You will be asked specific questions to identify your machine or the step will be divided into two parts; one part identified by ***Single Board Machine*** the other part identified by ***Two board Machines*** Perform the appropriate action for the machine you have. In some cases there will be a separate MAP for each machine.

**Note:** The POR sequence is different in the Wheelwriter 10, 15, 30, 35, 1500, 3000, 3500 when the Spell Check option is installed. The machine will beep twice (depending where the operator has set Code + 4), pause, then will beep one more time.

If an error code condition exists on your machine, go to "MAP 0170: Error Codes" on page 2-48. If the machine beeps and an error code appears while you are performing any diagnostic procedure, go to "MAP 0170: Error Codes" on page 2-48.

**001**

**Is the sheetfeed option installed on your machine?**

**Yes No**

**002**

Go to Step 004.

**003**

Go to Step 015 on page 2-5.

---

**004**

(From step 002)

- Turn the machine off.
- Check the cables for damage, proper alignment and fit.

**Are the cables good?**

**Yes No**

**005**

Repair as necessary.

**006**

- If your machine is a Wheelwriter 50, 70, 5000, or 7000, be sure the CRT is plugged into a properly operating a.c. outlet and connected to the CRT control board. Adjust the brightness and contrast controls on the CRT to the center of their range.
- Turn the machine on.

**Does the machine still fail?**

**Yes No**

**007**

- POR the machine several times.

(Step **007** continues)

007 (continued)

**Does the machine fail?**

**Yes No**

**008**

End the call.

**009**

Go to Step 010.

---

**010**

(From step 009)

— Inspect the machine for obvious failures such as:

- Loose line cord
- Paper clips, staples, or other foreign material in the machine.
- Dirt or contamination on the carrier or the platen
- Broken springs or levers
- Damaged covers
- Any machine or option cables disconnected.

**Do you have any of the above failures?**

**Yes No**

**011**

Go to Step 013.

**012**

Repair as necessary.

---

**013**

(From step 011)

**Is the sheetfeed option installed?**

**Yes No**

**014**

Go to Step 020 on page 2-6.

**015**

(From step 003)

**Does the typewriter operate correctly except for the sheetfeed?**

**Yes No**

**016**

— Turn the typewriter off.
— Disconnect the sheetfeed power/signal cable from the typewriter.
— Remove the sheetfeed from the typewriter.
— Turn the typewriter on.

(Step 016 continues)

016 (continued)

**Does the typewriter operate correctly?**

Yes No

**017**

Go to Step 020.

**018**

Go to "MAP 0540: Sheetfeed" on page 2-204.

---

**019**

Go to "MAP 0540: Sheetfeed" on page 2-204.

---

**020**

(From steps 014 and 017)

**Are any of the following options installed:**

- **Printer Option**
- **Diskette Option**
- **Pinwheel Forms Feeder**
- **32k Memory Expansion**
- **Spell Check**
- **Spell Check II**

Yes No

**021**

Go to Step 025 on page 2-7.

**022**

**Does the machine operate correctly except for an option(s)?**

Yes No

**023**

Go to Step 025 on page 2-7.

**024**

— Select the option that appears to be failing from the chart below and perform the required action.

| Option | Go To |
|---|---|
| Printer Option | "MAP 0480: Printer Option" on page 2-186. |
| Diskette Option | "MAP 0130: Diskette Option" on page 2-24. |
| Printer and Diskette Option | "MAP 0340: Options Inoperative" on page 2-134. |
| 32k Memory Expansion | "MAP 0330: Memory Expansion, Wheelwriter 30" on page 2-132. |
| Spell Check or Spell Check II | "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |

| Option | Go To |
|---|---|
| Pinwheel Forms Feeder | "MAP 0410: Pinwheel Form Feeder" on page 2-162. |
| End-Of-Ribbon Sensor | "MAP 0150: End-of-Ribbon Sensor" on page 2-36. |
| Out-Of-Paper Sensor | "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138. |

---

**025**

(From steps 021 and 023)
- Turn the machine off.
- Turn the machine on.

**Does the machine perform all steps of the POR?**

**Yes No**

**026**

**Does the machine display an error code?**

**Yes No**

**027**

Go to Step 032.

**028**

Go to "MAP 0170: Error Codes" on page 2-48.

**029**

***Wheelwriter 10, 15, 30, 35, 1500, 3000, 3500:*** Go to Step 043 on page 2-11.
***Wheelwriter 50, 70, 5000, 7000:***
**Does the machine appear to operate correctly except for the CRT display?**

**Yes No**

**030**

Go to Step 043 on page 2-11.

**031**

Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.

**032**

(From step 027)
- Turn the machine off.
- Turn the machine on.

(Step 032 continues)

032 (continued)

**Does the machine perform any steps of the POR?**

**Yes No**

033

**WW10, WW15, WW1500, WW3000:** Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116.

– or –

**WW30, WW35, WW3500:** Go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120.

– or –

**WW50, WW70, WW5000, WW7000:** Go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

034

***WW50, WW70, WW5000, WW7000*** – Go to Step 040 on page 2-10.

***WW30, WW35, WW3500*** – Go to Step 037 on page 2-9.

***WW10, WW15, WW1500, WW3000*** – Continue with this step.

– Check the following chart for your *identical* symptom:

| Symptom | Action |
|---|---|
| Incomplete POR. Machine is dead. LEDs do not turn on.<br>No motion in printwheel, carrier, index or ribbon when you turn the machine on. | Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116. |
| Incomplete POR. All LEDs stay on solid. | Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98. |
| Incomplete POR. All LEDs stay off. | Replace the function board/system board. |
| Incomplete POR. Carrier moves, printwheel moves but doesn't home. | Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| POR complete. The machine goes system busy with all LEDs on solid or all LEDs off. | Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98. |
| One inoperative key on keyboard. | Replace the Keyboard. |
| No SAPI operation. Paper Up/Down keybuttons work correctly. | Go to "MAP 0510: Semi-Automatic Paper Insertion" on page 2-196. |
| Error Code indication. | Go to "MAP 0170: Error Codes" on page 2-48. |
| POR complete. Ribbon will not feed. | Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190. |
| POR complete. Ribbon will not lift. | Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190. |
| POR complete. Correct character does not print when any keybutton or code + keybutton is pressed. | Go to "MAP 0520: Selection" on page 2-198. |
| One LED stays on or stays off all the time. | Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76. |

| Symptom | Action |
|---|---|
| Poor print quality (voids, character alignment, light characters). | Go to "MAP 0470: Print Quality" on page 2-184. |
| Poor correction quality. | Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190. |
| Loss of memory after machine is turned off then on. | Go to "MAP 0110: Battery Backup" on page 2-16. |
| Form feeder out of paper. No error code. | Go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138. |
| Machine at end of ribbon; no error code (for machines equipped with ribbon sensor). | Go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36. |
| Form feeder will not feed paper. Machine works. | Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162. |

**Do you see your *identical* symptom listed above?**

**Yes No**

**035**

Go to "MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000" on page 2-78.

**036**

Perform the required action.

---

**037**

(From step 034)

***WW30, WW35, WW3500*** –

– Check the following chart for your *identical* symptom:

| Symptom | Go To |
|---|---|
| All of display black, no beeps | "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32. |
| Top half of Display black, 6 beeps | "MAP 0170: Error Codes" on page 2-48. |
| Bottom Half of Display black, 6 beeps | "MAP 0170: Error Codes" on page 2-48. |
| All of display black, 6 beeps | "MAP 0170: Error Codes" on page 2-48. |
| The printwheel does not move | "MAP 0520: Selection" on page 2-198 |
| The Printwheel moves but does not home | "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| The Carrier does not move | "MAP 0580: Transport" on page 2-222. |
| The Platen does not move up or down | "MAP 0390: Paperfeed" on page 2-156. |
| The Print hammer does not move or energize | "MAP 0470: Print Quality" on page 2-184. |
| The carrier does not move to the right | "MAP 0580: Transport" on page 2-222. |

| Symptom | Go To |
|---|---|
| The ribbon plate does not move up and down. | "MAP 0490: Ribbon and Correcting Tape" on page 2-190. |
| The carrier will not move smoothly and quietly to the left side frame. | "MAP 0580: Transport" on page 2-222 |
| The carrier will not move to the left limit. | "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| The machine does not beep one time. The machine functions normally except for the beep. | The function board is failing. |
| The display is blank (no PELS on) at end of POR. The machine functions normally. | "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32. |
| The Display is blank (no PELS on) at end of POR. The machine does not function normally. | "MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-86. |
| Diskette will not initialize. | "MAP 0130: Diskette Option" on page 2-24. |
| The Display is black (all PELS on) at end of POR. | "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32. |
| Error code displayed | "MAP 0170: Error Codes" on page 2-48 |

**Do you have any of the identical symptoms listed above?**

**Yes No**

**038**

Go to "MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-86.

**039**

Perform the required action.

---

**040**

(From step 034)

***WW50, WW70, WW5000, WW7000*** –

– Check the following chart for your *identical* symptom:

| Symptom | Go To |
|---|---|
| • The CRT remains black (no raster) during or after POR. Six beeps may sound.<br>• Loss of vertical or horizontal sync.<br>• The CRT remains all white (raster on all the time). | "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20. |
| Printwheel does not move. | "MAP 0520: Selection" on page 2-198. |
| The Printwheel moves but does not home | "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| The Carrier does not move | "MAP 0580: Transport" on page 2-222. |

| Symptom | Go To |
|---|---|
| The Platen does not move up or down | "MAP 0390: Paperfeed" on page 2-156. |
| The Print hammer does not move or energize | "MAP 0470: Print Quality" on page 2-184. |
| The carrier does not move to the right | "MAP 0580: Transport" on page 2-222. |
| The ribbon plate does not move up and down. | "MAP 0490: Ribbon and Correcting Tape" on page 2-190. |
| The carrier will not move smoothly and quietly to the left side frame. | "MAP 0580: Transport" on page 2-222 |
| The carrier will not move to the left limit. | "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| The machine does not beep one time. The machine functions normally except for the beep. The Wheelwriter 50, 5000 will sound spelling beeps before sounding the POR beep. | The function board is failing. |
| WW70, WW7000 — The typewriter screen does not appear on the CRT. WW50, WW5000 — The margin scale does not appear on the CRT. | "MAP 0120; CRT Display WW 50, 70, 5000, 7000" on page 2-20. |
| Diskette will not initialize. | "MAP 0130: Diskette Option" on page 2-24. |
| Error code displayed | "MAP 0170: Error Codes" on page 2-48 |

**Do you have any of the identical symptoms listed above?**

**Yes No**

**041**

Go to "MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-86.

**042**

Perform the required action.

---

**043**

(From steps 029 and 030)

- Put a piece of paper into the machine. If SAPI doesn't work, pull the paper release lever forward and slide the paper into the machine.
- Press each character keybutton from A to Z.

**Does the electronics sense any keybuttons?**

**Yes No**

**044**

Go to "MAP 0260: Keyboard" on page 2-96.

**045**

(Step **045** continues)

045 (continued)

**Can you type 3 lines of characters without a system busy?**

**Yes No**

**046**

***WW10, WW15, WW1500, WW3000:*** to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

— or —

***WW30, WW35, WW3500:*** to "MAP 0280: Machine Electronics, Wheelwriter 30, 35, 3500" on page 2-104.

— or —

***WW50, WW70, WW5000, WW7000:*** to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**047**

- Turn the machine off.
- Move the carrier to the right frame.
- Turn the machine on.

**Does the carrier move smoothly and quietly to the left side frame?**

**Yes No**

**048**

Go to "MAP 0580: Transport" on page 2-222.

**049**

- Use SAPI to load paper.

**Does the paper load correctly without skewing, excessive noise, and without marks?**

**Yes No**

**050**

Go to "MAP 0510: Semi-Automatic Paper Insertion" on page 2-196.

**051**

- Press the paper up and paper down keybuttons.

**Does the platen move up and down?**

**Yes No**

**052**

- Press each keybutton.

**Does the electronics sense any keybutton?**

**Yes No**

**053**

Go to "MAP 0260: Keyboard" on page 2-96.

**054**

Go to "MAP 0390: Paperfeed" on page 2-156.

055

- If the printer option is installed make sure its not active.
- Press each character keybutton.

**Does the electronics sense each character keybutton?**

**Yes No**

056

Go to "MAP 0260: Keyboard" on page 2-96.

057

- Perform each coded keybutton function.

**Do the functions perform correctly?**

**Yes No**

058

***Wheelwriter 10, 15, 1500, 3000:*** Go to "MAP 0260: Keyboard" on page 2-96.

***Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:***

Some coded functions have messages that appear on the display or CRT.

**Do the coded functions work correctly but the messages not appear on the display or CRT? If in doubt refer to the operators manual for those that should appear.**

**Yes No**

059

Go to "MAP 0260: Keyboard" on page 2-96.

060

***Wheelwriter 30, 35, 3500:***

Go to "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.

***Wheelwriter 50, 70, 5000, 7000:***

Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.

061

***Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:*** Go to Step 063.

***Wheelwriter 10, 15, 1500, 3000:***

- Turn all the LEDs on and off one at a time.

**Do all the LED indicators turn on and off?**

**Yes No**

062

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

063

(From step 061)

- Type several characters.

(Step 063 continues)

063 (continued)

**Does the print hammer push the printwheel petal against the paper?**

**Yes No**

064

Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.

065

— Type several characters.

**Do characters print (ink transfers to the paper)?**

**Yes No**

066

Go to "MAP 0470: Print Quality" on page 2-184.

067

**Does the correct character print when you press a keybutton?**

**Yes No**

068

Go to "MAP 0520: Selection" on page 2-198.

069

**Is the print quality good?**

**Yes No**

070

Go to "MAP 0470: Print Quality" on page 2-184.

071

**Is the correction quality good?**

**Yes No**

072

Go to "MAP 0470: Print Quality" on page 2-184.

073

**Are any options installed on the machine?**

**Yes No**

074

No trouble found. Try to recreate the problem.

075

Go to "MAP 0340: Options Inoperative" on page 2-134.

## Notes

## MAP 0110: Battery Backup

**CAUTION:**

***Memory will be lost if you disconnect the batteries from the function board/system board while the machine is turned off.***

**001**

*All Single board machines and two-board WW10:*
- **Are the batteries installed correctly in the battery holder and the cable correctly connected to J-7 on the function board/system board?**

*Other Two board machines:*
- **Are the batteries installed correctly in the battery holder and the cable correctly connected to J-4 on the function board?**

**Yes No**

**002**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

**003**

~~— Turn the machine on.~~

*All Single board machines and two board WW10:*

— Measure the voltage between J7-1 (red) and J7-3 (black) on the plug.

*Other Two board machines:*

— Measure the voltage between J4-1 (red) and J4-3 (black) on the plug.

*Two battery machines:*

**TWO BATTERY MACHINES: Does the voltage measure 2.3 to 3.2 V dc?**

**THREE BATTERY MACHINES: Does the voltage measure 3 to 5 V dc?**

**Yes No**

**004**

***Do not disconnect the battery cable from the unless the machine is turned on.***

*All single board machines and two-board WW10:*

— Disconnect J-7 from the function board/system board.

— Measure the voltage between J7-1 (red) and J7-2 (black) on the plug.

*Other two-board machines:*

— Disconnect J-4 from the function board.

— Measure the voltage between J4-1 (red) and J4-2 (black) on the plug.

**TWO BATTERY MACHINES: Does the voltage measure 2.3 to 3.2 V dc?**

**THREE BATTERY MACHINES: Does the voltage measure 3 to 5 V dc?**

**Yes No**

**005**

Go to Step 008 on page 2-17.

**006**

The function board is failing.

---

**007**

(Step **007** continues)

**007** (continued)
Go to Step 011.

---

**008**

(From step 005)
- Remove the batteries from the battery holder.
- Check the battery cable for continuity.
- Check the battery holder for damage or corrosion.

**Are the battery holder and cable good?**

Yes No

**009**

The battery pack is failing.

**010**

The batteries are failing.

---

**011**

(From step 007)
- Turn the machine off.
- Turn the machine on.

**Do you still have an error indication?**

Yes No

**012**

Go to "MAP 0100: Start" on page 2-4.

**013**

**Does the machine have two boards?**

Yes No

**014**

The function board is failing.

**015**

Go to Step 016.

---

**016**

(From step 015)
- Turn the machine off.
- Remove the 22-pin cable between the motor control board and the function board.

**Does the cable have any cracks, breaks, or damaged edges?**

Yes No

**017**

- Check the cable for continuity.

(Step **017** continues)

017 (continued)

**Is there continuity?**

**Yes No**

**018**

Replace the cable.

**019**

- Install the cable.
- Check the cable for correct alignment and fit.
- Turn the machine on.

**Do you still have the same symptom?**

**Yes No**

**020**

Go to "MAP 0100: Start" on page 2-4.

**021**

The motor control board is failing.

— or —

The function board is failing.

**022**

The cable is failing.

Notes

## MAP 0120: CRT Display WW 50, 70, 5000, 7000

**Note:** Be sure the CRT display is plugged into a properly functioning AC outlet and connected to the CRT control board.

**001**

– Check the following chart for your *identical* symptom.

| Symptom | Action |
|---|---|
| • Image on screen rolls up or rolls down (Loss of vertical sync.)<br>• Image on screen rolls sideways (Loss of horizontal sync).<br>• Loss of both horizontal and vertical sync. | The CRT control board is failing.<br>or<br>The CRT display assembly is failing. |
| • Image on screen all white. Controls on CRT have no effect. | The CRT control board is failing.<br>or<br>The function board is failing.<br>or<br>The CRT display assembly is failing. |

**Did you find the exact symptom from the chart above?**

**Yes No**

**002**

Go to Step 004.

**003**

Perform the required action.

**004**

(From step 002)

– Turn the CRT display power on.

– Adjust the brightness and contrast controls to 3/4 clockwise.

– Turn the machine on.

**Does the CRT remain dark during or after POR?**

**Yes No**

**005**

The 22-pin cables from the CRT control board to the function board are failing.

– or –

The function board is failing.

– or –

The CRT control board is failing.

– or –

The CRT display assembly is failing.

**006**

– Turn the CRT display power off.

(Step 006 continues)

**006** (continued)

- Turn the machine off.
- Disconnect the CRT display from the CRT control card.
- Turn the CRT display power on.

**Does a raster appear (screen lights up)on the CRT? You may have to adjust the brightness.**

**Yes No**

**007**

The CRT display is failing.

**008**

- Turn the machine on.
- Measure the voltage between the +5v test point and GND on the CRT control board.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**009**

- Turn the machine off.
- Disconnect the options power supply cable from the CRT board.
- Turn the machine on.
- Measure the voltage between J3-5(+5 VDC) and J3-6(GND) on the plug.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**010**

- Check the continuity of the options power supply cable.

**Is there continuity?**

**Yes No**

**011**

The options power supply cable is failing.

**012**

The power supply assembly is failing.

---

**013**

The CRT control board is failing.

---

**014**

**Is the diskette option installed?**

**Yes No**

**015**

Go to Step 018 on page 2-22.

**016**

(Step **016** continues)

**016** (continued)

- Turn the machine off.
- Disconnect the cables from J13 and J14 on the function board.
- Turn the machine on.

**Do you still have the same symptom?**

**Yes No**

**017**

The 22-pin cables are failing.

— or —

The diskette control board is failing.

— or —

The function board is failing.

**018**

(From step 015)

The 22-pin cables from the CRT control board to the function board are failing.

— or —

The CRT control board is failing.

— or —

The function board is failing.

— or —

The CRT assembly is failing.

Notes

## MAP 0130: Diskette Option

**001**

- Check diskette control board for proper installation.
- If the printer option board is installed make sure it is installed correctly.

**Is the diskette control board properly installed?**

**Yes No**

**002**

Correct it and go to "MAP 0100: Start" on page 2-4.

**003**

- Check the white 22-pin cables on the options for proper alignment, and fit. Also check for damage.

**Are all cables good?**

**Yes No**

**004**

Repair and go to "MAP 0100: Start" on page 2-4.

**005**

- Check the diskette drive cable for proper installation.

Error code 161 will be displayed if the drive cable is not connected.

**Is the cable properly attached to the diskette control board?**

**Yes No**

**006**

Repair and go to "MAP 0100: Start" on page 2-4.

**007**

**Did you come here from the Error Code MAP?**

**Yes No**

**008**

**Does the disk drive initialize?**

**Yes No**

**009**

Replace these FRUs in the following order:

1. Diskette control board and cables
2. Function board and cables
3. Interface board
4. Disk drive
5. Printer option board (if installed).

**010**

If your machine is a Wheelwriter 30, 35, or 3500, go to Step 020 on page 2-26.
(Step 010 continues)

**010** (continued)
If your machine is a Wheelwriter 50, 70, 5000 or 7000, go to Step 025 on page 2-26.

---

**011**

- Locate the error code you had in the following chart.

| Error Code | Failure | Go To |
|---|---|---|
| 160 | RAM check failure<br>Diskette controller check failure. | Step 014. |
| 161 | Diskette drive operation check failure | Step 017. |
| 162 | Code version level check | Verify the diskette code matches the base code. |

**Do you see your identical error code listed above?**
**Yes No**

**012**

If your machine is a Wheelwriter 30, 35 or 3500, go to Step 020 on page 2-26.
If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to Step 025 on page 2-26.

**013**

Perform the required action.

---

**014**

(From step 011)
With error code 160 displayed.

- Turn the machine off.
- Replace the diskette control board.
- Turn the machine on.

**Do you still have the same symptom?**
**Yes No**

**015**

Go to "MAP 0100: Start" on page 2-4.

**016**

Replace the function board and 22-pin cables.

---

**017**

(From step 011)
With error code 161 displayed.

- Turn the machine off.
- Replace the diskette drive.
- Turn the machine on.

(Step **017** continues)

**017** (continued)

**Do you still have the same symptom?**

**Yes No**

**018**

Go to "MAP 0100: Start" on page 2-4.

**019**

Replace the FRUS in the following order:

1. Diskette drive interface board
2. Diskette drive to diskette control board cable.
3. Diskette control board
4. Function board

---

**020**

(From steps 010 and 012)

The following tests requires the use of a scratch diskette.

You must run the prepare function on the diskette before you run the test. This will destroy all data on the diskette. *Be sure to use a diskette that does not contain useful data.*

- Run the prepare function.
- Activate the Diskette Service diagnostics by holding down Code and Shift while pressing the = key.
- Select TEST from the Diskette service menu.

**Does the test perform successfully?**

**Yes No**

**021**

- Check the continuity of the diskette drive cable.

**Is the continuity good?**

**Yes No**

**022**

The diskette drive-to-diskette control board cable is failing.

**023**

Go to Step 032 on page 2-27.

**024**

Go to Step 038 on page 2-29.

---

**025**

(From steps 010 and 012)

The following tests requires the use of a scratch diskette.

You must format the diskette before you run the test. This will destroy all data on the diskette. *Be sure to use a diskette that does not contain useful data.*

- WW70, WW7000 – Select FORMAT A DISKETTE from the word processor menu and format a diskette.
- WW50, WW5000 – Select PREPARE from the menu and prepare (format) a diskette.

(Step **025** continues)

025 (continued)

**Are you able to FORMAT or PREPARE a diskette?**

**Yes No**

**026**

- Try another diskette.

**Does the diskette FORMAT or PREPARE correctly?**

**Yes No**

**027**

Replace these FRUs in the following order:

1. Diskette control board
2. Disk drive assembly
3. Function board
4. Diskette control board-to-disk drive cable
5. Printer option board (if installed).

**028**

Go to Step 029.

---

**029**

(From step 028)

- Activate the Diskette Service diagnostics by holding down Code and Shift while pressing the = key.
- Select TEST from the Diskette service menu.

**Does the test perform successfully?**

**Yes No**

**030**

Go to Step 032.

**031**

Go to Step 038 on page 2-29.

---

**032**

(From steps 023 and 030)

- Look in the following chart for the diskette test error code on the display.

| **Error Code** | **Failure** | **Action** |
|---|---|---|
| 001 XY | Bad Command | Replace the control board or the 22-pin cables. |
| 002 XY | Bad Address Mark | Go to Step 035 on page 2-28. |
| 004 XY | Record Not Found | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 043 on page 2-30. |
| 006 | Defective RAM | Replace the control board or the 22-pin cables. |
| 007 | Motor Speed Incorrect | Go to Step 037 on page 2-29. |

| Error Code | Failure | Action |
|---|---|---|
| 010 XY | Bad CRC | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 043 on page 2-30. |
| 020 XY | Defective Controller | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30. |
| 040 XY | Bad Seek | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30. |
| 060 XY | Bad Controller Seek | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30. |
| 080 XY | Time Out | WW30, 35, 3500 - Go to Step 036 on page 2-28.<br>WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30. |

**Note:** The X in the error code = side, and the Y = operation. Locate the error code numbers in the following chart to determine the problem.

| Side | Operation |
|---|---|
| X = 0 - side 0<br>X = 1 - side 1 | Y = 0 - reset<br>Y = 1 - reserved<br>Y = 2 - read<br>Y = 3 - write<br>Y = 4 - verify<br>Y = 5 - format |

**Do you have any of the error codes listed above?**

**Yes** **No**

**033**

Go to Step 038 on page 2-29.

**034**

Perform the required action.

---

**035**

(From step 032)
Error code 002 XY displayed during TEST.
Replace the FRUS in the following order:

1. Diskette drive
2. Diskette control board
3. Diskette drive to control board cable.
4. Function board and 22-pin cables

---

**036**

(From step 032)
(Step **036** continues)

**036** (continued)
Error code 004 XY, 010 XY, 020 XY, 040 XY, 060 XY, or 080 XY displayed during TEST.
Replace the FRUS in the following order.

1. Interface board
2. Diskette drive
3. Diskette control board
4. Function board and cables

---

037

(From step 032)
Error code 007 displayed.
Replace the FRUS in the following order.

1. Diskette drive
2. Interface board
3. Diskette control board
4. Function board and cables

---

038

(From steps 024, 031, and 033)
- Make sure the write-protect window is open on the scratch diskette.
- Select Write-Protect from the service diagnostics menu.
- Run the test.

**Is error code 003 displayed?**

**Yes No**

039

No trouble found.
Try to recreate the failure.

040

- Check to make sure the diskette Write-Protect window is open.
- Try a new diskette (be sure to prepare the diskette prior to use)
- Select Write-Protect and run the test again.

**Is Error 003 still displayed?**

**Yes No**

041

Go to "MAP 0100: Start" on page 2-4.

042

Replace the FRUS in the following order:

1. Diskette drive
2. Interface board
3. Diskette control board.
4. Function board and cables

**043**

(From step 032)
Error code 004XY or 010 XY displayed during test.
— Try a new diskette. Be sure to FORMAT or PREPARE the diskette before using it.

**Does the machine display the same error code during test?**

**Yes No**

**044**

The original diskette is failing.

**045**

Replace these FRUs in the following order:

1. Interface board
2. Disk drive assembly
3. Diskette control board
4. Function board.

---

**046**

(From step 032)
Error code 020 XY, 040 XY, 060 XY, or 080 XY displayed during TEST.
Replace the FRUS in the following order:

1. Interface board
2. Diskette drive
3. Diskette control board
4. Function board and cables.

Notes

## MAP 0140: Display, Wheelwriter 30, 35, 3500

**001**

- Turn the machine off.
- Turn the machine on.
- Adjust the contrast control to the center of its range.

**Is the display black (all PELs on)?**

**Yes No**

**002**

Go to Step 004.

**003**

The function board is failing.

— or —

The display is failing.

— or —

The display cable is failing (WW30 only).

---

**004**

(From step 002)

**Is the display blank (no PELs on)?**

**Yes No**

**005**

Go to Step 013 on page 2-33.

**006**

- Adjust the contrast control fully clockwise.

**Is the display still blank?**

**Yes No**

**007**

- Adjust the contrast control over its entire range.

**Does the display operate properly?**

**Yes No**

**008**

The display is failing.

— or —

The function board is failing.

**009**

Go to "MAP 0100: Start" on page 2-4.

---

**010**

(Step **010** continues)

010 (continued)
- *WW35, 3500:* Go to Step 012
- *WW30:* Check the continuity of the display cable.

**Is there continuity?**

**Yes No**

**011**

The display cable is failing.

**012**

(From step 010)

The function board is failing.

— or —

The display is failing.

---

**013**

(From step 005)

**Does the display have missing, partial, or extra characters.**

**Yes No**

**014**

Go to Step 016.

**015**

The display is failing.

— or —

The function board is failing.

---

**016**

(From step 014)

**Are any PELs missing, or do any stay on all the time?**

**Yes No**

**017**

Go to Step 019.

**018**

The display is failing.

---

**019**

(From step 017)

**Is the display too light or too dark?**

**Yes No**

**020**

Go to "MAP 0100: Start" on page 2-4.

**021**

The display is failing.
— or —
The function board is failing.

Notes

## MAP 0150: End-of-Ribbon Sensor

**001**

- Remove the ribbon cartridge from the machine.
- Activate the switch and sensor test (CODE + SHIFT +TSet).

***WW10, 15, 1500, 3000* -Does the BOLD LED on the indicator panel come on solid?**
***WW30, 35, 50, 70, 3500, 5000, 7000* -Does the BOLD indicator come on?**

Yes No

**002**

Go to "MAP 0160: End-of-Ribbon Sensor Electrical" on page 2-40.

**003**

- Slowly pass a piece of paper between the LED and ribbon sensor in the end of ribbon housing.

***WW10, 15, 1500, 3000* - Does the BOLD LED go off and on?**
***WW30, 35, 50, 70, 3500, 5000, 7000* -Does the BOLD indicator go off and on?**

Yes No

**004**

Go to "MAP 0160: End-of-Ribbon Sensor Electrical" on page 2-40.

**005**

- Examine the ribbon sensor and LED for paper dust, ribbon particles or obstructions.

**Is the sensor and LED clean?**

Yes No

**006**

Clean the sensor and LED and go to "MAP 0100: Start" on page 2-4.

**007**

**Does the machine detect the end of the ribbon?**

Yes No

**008**

**Note:** When typing from the keyboard, rely on the color trailer at the end of the ribbon to signal the end of the ribbon.
Go to Step 012 on page 2-37.

**009**

**Does the machine display an end-of-ribbon error code before the ribbon has reached the trailer?**

Yes No

**010**

Go to "MAP 0100: Start" on page 2-4.

**011**

Go to Step 025 on page 2-38.

---

**012**

(From step 008)

**Is the ribbon that was on the machine when the problem occurred still available?**

Yes No

**013**

- Examine the ribbon that is on the machine.

**Is the trailer showing?**

Yes No

**014**

Go to Step 020.

**015**

Go to Step 018.

---

**016**

**Is the trailer showing?**

Yes No

**017**

Go to Step 020.

**018**

(From step 015)

- Examine the trailer for a piece of silver tape between the end of the inked portion of the ribbon and the beginning of the trailer.

**Is the silver tape in place?**

Yes No

**019**

The ribbon is failing.

**020**

(From steps 014 and 017)

**Is the end-of-ribbon sensor free of obstruction, and positioned correctly?**

Yes No

**021**

Correct the sensor problem and go to "MAP 0100: Start" on page 2-4.

**022**

(Step **022** continues)

**022** (continued)

— Check the ribbon lift adjustment. See page 3-5.

**Is the adjustment correct?**

**Yes No**

**023**

Correct the adjustment and go to "MAP 0100: Start" on page 2-4.

**024**

Ask the customer to save the ribbon if the problem happens again and end the call.

---

**025**

(From step 011)

— Check the ribbon for scratches, voids, or other damage.

**Is the ribbon damaged?**

**Yes No**

**026**

Go to Step 028.

**027**

Try a new ribbon.

---

**028**

(From step 026)

**Is the end-of-ribbon sensor free of obstruction, and positioned correctly?**

**Yes No**

**029**

Correct the sensor problem and go to "MAP 0100: Start" on page 2-4.

**030**

— Check the ribbon lift adjustment. See page 3-5.

**Is the adjustment correct?**

**Yes No**

**031**

Correct the adjustment and go to "MAP 0100: Start" on page 2-4.

**032**

— Check for a bright light shining directly on the typewriter such as sunlight, overhead light, or desk light.

**Is there a bright light shining on the typewriter?**

**Yes No**

**033**

(Step 033 continues)

**033** (continued)
End the call.

**034**

- Turn the light off, block the light from shining on the machine, or move the machine so the light does not shine on the paper sensor.

**Does the machine still malfunction?**

**Yes No**

**035**

Inform the customer that the bright light is causing the machine to malfunction.

**036**

Do the following:

Try a new ribbon.
Check all sensor adjustments.
Replace the sensor assembly.

## MAP 0160: End-of-Ribbon Sensor Electrical

**001**

***Single board machines:***

- Go to Step 003.

***Two board machines:***

- Check the 16-pin and 22-pin cables between the function board and the motor control board for cracks, breaks, damaged contacts or damaged outer edges.

**Are the cables good?**

**Yes No**

**002**

Replace the failing cable.

**003**

(From step 001) .

***Single board machines:***

- Check the carrier cable at the system board end for breaks, damaged contacts, or damaged outer edges.

***Two board machines:***

- Check the carrier cable at the motor control board end for breaks, damaged contacts, or damaged outer edges.

**Is the cable good?**

**Yes No**

**004**

The carrier cable is failing.

**005**

- Check the end of the ribbon sensor and LED for paper dust, ribbon particles or obstructions.

**Are the sensor and LED clean?**

**Yes No**

**006**

Clean and go to "MAP 0100: Start" on page 2-4.

**007**

(From step 012)

- Turn the machine on.
- Tab to the right side frame.
- Remove the ribbon cartridge.
- Activate the sensor and switch test (CODE + SHIFT + TSet).

**Does the BOLD indicator come on solid?**

**Yes No**

**008**

- Press any keybutton to exit the sensor and switch test.
- Press CODE + BOLD.

(Step **008** continues)

008 (continued)

**Does the BOLD indicator come on?**

**Yes No**

**009**

Go to "MAP 0100: Start" on page 2-4.

**010**

- Enter the sensor and switch test again.

**Does the BOLD indicator come on solid?**

**Yes No**

**011**

Go to Step 024 on page 2-43.

**012**

Go to Step 007 on page 2-40.

---

**013**

- Slowly pass a piece of paper between the opening in the ribbon sensor. Ensure the paper is between the LED and the sensor.

**Does the BOLD indicator go on and off?**

**Yes No**

**014**

Go to Step 016 on page 2-42.

**015**

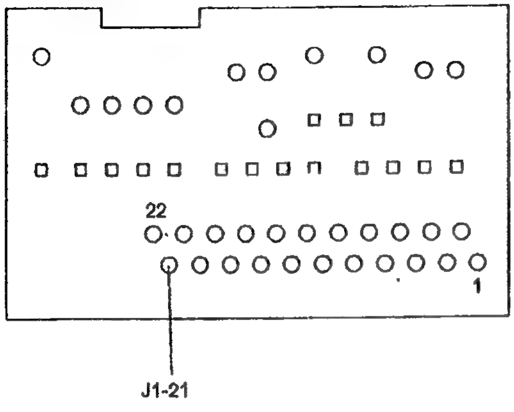
Go to "MAP 0100: Start" on page 2-4.

**016**

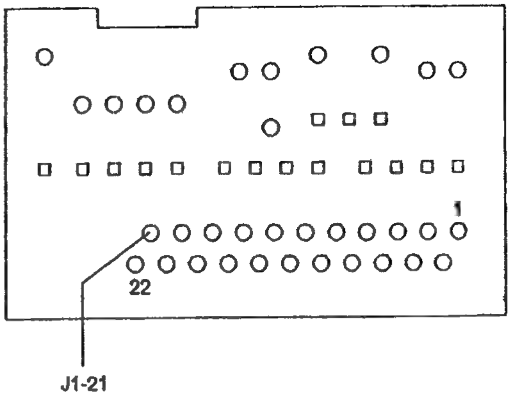
(From step 014)

***WW10 with system board:***

- Monitor the voltage at the J1-21 on the carrier cable board as you pass a piece of paper through the opening in the ribbon sensor.



Level 1



Level 2

**Does the voltage change?**

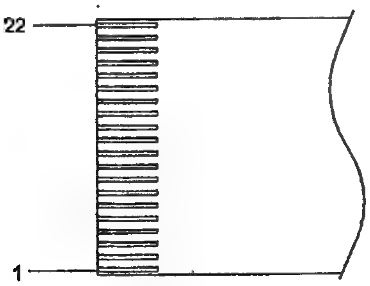
**Yes No**

**017**

Go to Step 024 on page 2-43.

**018**

- Check the continuity of line 21 and of line 6 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**019**

The carrier cable is failing.

**020**

***Single board machines:***

The function board is failing.

***Two board machines:***

(Step **020** continues)

**020** (continued)

– Check the continuity of the 16-pin cable between the motor control board and the function board.

**Is there continuity?**

**Yes No**

**021**

The 16-pin cable is failing.

– Replace the motor control board.

– Slowly pass a piece of paper through the opening in the ribbon sensor.

**Does the BOLD indicator go on and off?**

**Yes No**

**022**

The function board is failing. Reinstall the original motor control board prior to replacing the function board.

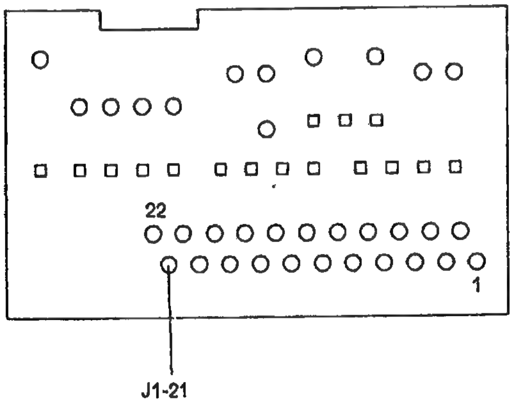
**023**

Go to "MAP 0100: Start" on page 2-4

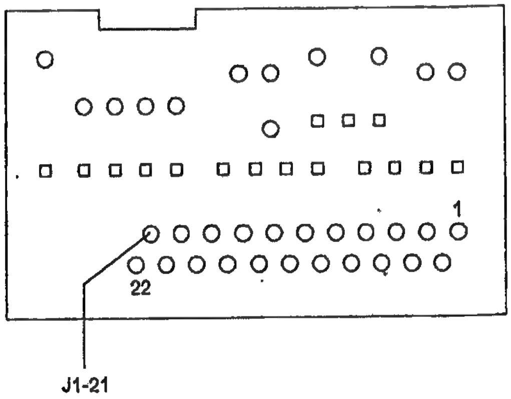
**024**

(From steps 011 and 017)

– Measure the voltage at J1-21 in the carrier cable board.



Level 1



Level 2

**Is the voltage between 4.5 V dc and 5.5 V dc?**

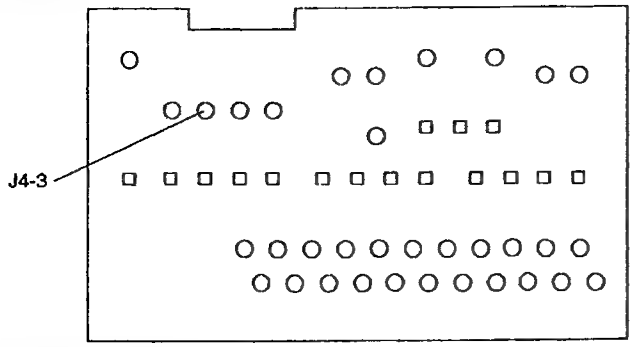
**Yes No**

**025**

Go to Step 036 on page 2-45.

**026**

- Monitor the voltage at J4-3 on the carrier cable board as you pass a piece of paper through the sensor.



**Does the voltage change approximately 0 to 5 V dc?**

**Yes No**

**027**

- Turn the machine off.
- Measure the continuity between the following points on the wiring side of the carrier cable board:

Table 2-1.

| J4 Pin | Carrier Cable Connector Pin |
|---|---|
| 1 | 7 |
| 2 | 19 |
| 3 | 21 |
| 4 | 6 |

**Is there continuity?**

**Yes No**

**028**

The carrier cable board is failing.

**029**

The end-of-ribbon sensor is failing.

**030**

- Check the continuity of line 21 in the carrier cable between the end of the carrier cable and J4-3 on the carrier cable board.

**Is there continuity?**

**Yes No**

**031**

(Step **031** continues)

**031** (continued)
Go to Step 033.

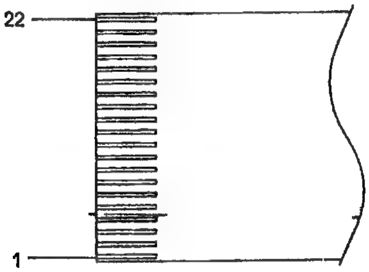
**032**

***Single board machines:***
The function board is failing.
***Two-board machines:***
The motor control board is failing.

---

**033**

(From step 031)
- Check the continuity of line 21 in the carrier cable.



CARRIER CABLE

**Is there continuity?**
**Yes No**

**034**

The carrier cable is failing.

**035**

The carrier cable board is failing.

---

**036**

(From step 025)
- Turn the machine off.
- Turn the machine on.
- Measure the voltage at J1-21 on the carrier cable board.

**Is the voltage less than 4.0 V dc?**
**Yes No**

**037**

The function board is failing.

**038**

- Turn the machine off.
- Disconnect the sensor assembly cable from J4 on the carrier cable board.
- Turn the machine on.
- Measure the voltage at J1-21 on the carrier cable board.

(Step **038** continues)

038 (continued)

**Is the voltage less than 4.0 V dc?**

**Yes No**

**039**

The sensor assembly is failing.

**040**

- Turn the machine off.
- Disconnect the carrier cable from the carrier cable board.
- Turn the machine on.
- Measure the voltage at line 21 of the carrier cable at the carrier end of the cable.

**Is the voltage less than 4.0 V dc?**

**Yes No**

**041**

The carrier cable board is failing.

**042**

- Turn the machine off.
- Check the continuity of line 6 and line 21 of the carrier cable.

**Is there continuity?**

**Yes No**

**043**

The carrier cable is failing.

**044**

***Single board machines:***
The function board is failing.
***Two-board machines:***
The motor control board is failing.

Notes

# MAP 0170: Error Codes

## Wheelwriter 10, 15, 1500, 3000 Error Codes

**B = LEDs blink at same time**
**S = LEDs blink sequentially**

**Base Machine Error Codes**

| Beeps | LED 1 | LED 1.5 | LED 2 | LED 3 | Fault | Action |
|---|---|---|---|---|---|---|
| 6 | B |  |  | B | Function board failure<br>System board failure | The function board is failing.<br>The system board is failing. |
| 6 | B |  | B | B | Selection homing failure | Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| 6 | B | B |  | B | ROM scan error | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |
| 6 | B |  | B |  | Invalid keyboard | Go to "MAP 0260: Keyboard" on page 2-96. |
| 6 | B | B | B |  | Spelling RAM | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |
| 3 | B | B | B | B | Dead Batteries | Go to "MAP 0110: Battery Backup" on page 2-16. |
| 3 | S | S | S | S | Low Batteries | Go to "MAP 0110: Battery Backup" on page 2-16. |
| 6 | B | B |  |  | Feature Disable Error | Go to "MAP 0340: Options Inoperative" on page 2-134. |
| 6 | B | B | B |  | Spelling RAM/Correction Buffer failure | The function board is failing.<br>The system board is failing. |
| 3 | B |  | B | B | Transport Failure | Go to "MAP 0580: Transport" on page 2-222. |
| 3 | B | B | B | B | Not an Error See Note | Power the printer Off then On |

**Note:** (WW15, WW1500, and WW3000) LED 1 and 3 will alternate blinking with LED 1.5 and 2. This LED code indicates the batteries are "Good." and the machine has performed a reset of the format and forms storage areas. This code is displayed upon initial battery installation or battery replacement with the power off.

**Printer Option Errors**

| Beeps | LED 1 | LED 1.5 | LED 2 | LED 3 | Fault | Action |
|---|---|---|---|---|---|---|
| 6 | S | S | | | Printer Option Error | Printer option board is failing. |
| 3 | B | | | | Out-of-Paper | If not out of paper, go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138. |
| 3 | | B | | | End-of-Ribbon | If not at end of ribbon, go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36. |
| 3 | | | | B | Printwheel Change | Install correct printwheel. |
| 3 | | | | B | Missing Printwheel | Install printwheel. |

## Wheelwriter 30, 35, 3500 Error Codes

**Base Machine Error Codes**

| Beeps | Error Indicator | Fault | Action |
|---|---|---|---|
| 6 | 114 08 | Function board failure | The function board is failing. |
| 6 | 114 10 | Memory Expansion Failure | The 32K memory module is failing or the function board is failing. |
| 6 | 215 | Selection homing failure | Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| 6 | 101 | ROM scan error | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |
| 6 | 121 | Invalid keyboard | Go to "MAP 0260: Keyboard" on page 2-96. |
| 6 | Bottom half of display is black. | Base Memory | The function board is failing. |
| 6 | Top half of display is black. | LCD Memory | The function board is failing. |
| 6 | Display is all black. | | The function board is failing. |
| 3 | Low Battery | Dead Batteries | Go to "MAP 0110: Battery Backup" on page 2-16. |
| 3 | Low Battery | Low Batteries, Storage Cleared | Go to "MAP 0110: Battery Backup" on page 2-16. |
| 6 | 102 | Feature Disable Error | Go to "MAP 0340: Options Inoperative" on page 2-134. |
| 6 | 140 | Spelling RAM/Correction Buffer Failure | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |

| Beeps | Error Indicator | Fault | Action |
|---|---|---|---|
| 6 | 141 | Spelling Invalid or Missing Spelling Dictionary | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |

**Printer Option Errors**

| Beeps | Error Indication | Fault | Action |
|---|---|---|---|
| 6 | 101 80 | Printer Option Not Found | Printer option board is failing.<br>or<br>Function board is failing.<br>or<br>Cables are failing. |
| 6 | 131 | Printer Option Error | Printer option board is failing. |
| 3 | Out Of Paper | Out-of-Paper | If not out of paper, go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138. |
| 3 | End Of Ribbon | End-of-Ribbon | If not at end of ribbon, go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36. |
| 3 | Change Wheel | Printwheel Change | Install correct printwheel. |
| 3 | Missing Wheel | Missing Printwheel | Install printwheel. |
| 6 | 102 | Feature Disable Error | Go to "MAP 0340: Options Inoperative" on page 2-134. |

**Diskette Errors**

| Beeps | Error Indication | Fault | Action |
|---|---|---|---|
| 6 | 101 90 | Diskette Not Found | Diskette control board is failing.<br>or<br>Function board is failing.<br>or<br>Cables are failing. |
| 6 | 160 | RAM/Diskette Control Failure | Go to "MAP 0130: Diskette Option" on page 2-24. |
| 3 | 161 | Diskette Drive Operator Check Failure | Go to "MAP 0130: Diskette Option" on page 2-24. |
| 3 | 162 | Code Mismatch | Go to "MAP 0130: Diskette Option" on page 2-24. |

# Wheelwriter 50, 70, 5000, 7000 Error Codes

## Base Machine Error Codes

| Beeps | Error Indicator | Fault | Action |
|---|---|---|---|
| 6 | 101 20 | Spelling dictionary not found | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |
| 6 | 101 40<br>101 48<br>101 55 | ROM Scan Error | The function board is failing. |
| 6 | 101 80<br>101 88 | Printer Option not found (if installed) | Go to "MAP 0480: Printer Option" on page 2-186. |
| 6 | 101 90<br>101 98 | Diskette Option not found (if installed) | Go to "MAP 0130: Diskette Option" on page 2-24. |
| 6 | 101 C0<br>101 EF<br>101 F5 | Check Sum Error | The function board is failing. |
| 6 | 114 08<br>114 10<br>114 18<br>114 19 | RAM Failure | The function board is failing. |
| 6 | 121 | Invalid keyboard | Go to "MAP 0260: Keyboard" on page 2-96. |
| 6 | 215 | Homing Sensor failure | Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56. |
| 6 | Display Blank | CRT display board not found. | Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20. |
| 6 | 140 | Spelling RAM not found | Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216. |

## Printer Option Errors

| Beeps | Error Indication | Fault | Action |
|---|---|---|---|
| 6 | 131 | Printer Option Error | Printer option board is failing. |
| 3 | Out Of Paper | Out-of-Paper | If not out of paper, go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138. |
| 3 | End Of Ribbon | End-of-Ribbon | If not at end of ribbon, go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36. |
| 3 | Change Wheel | Printwheel Change | Install correct printwheel. |
| 3 | Missing Wheel | Missing Printwheel | Install printwheel. |
| 6 | 102 | Feature Disable Error | Go to "MAP 0340: Options Inoperative" on page 2-134. |

**Diskette Errors**

| Beeps | Error Indication | Fault | Action |
|---|---|---|---|
| 6 | 160 | RAM/Diskette Control Failure | Go to "MAP 0130: Diskette Option" on page 2-24. |
| 6 | 161 | Diskette Drive Operator Check Failure' | Go to "MAP 0130: Diskette Option" on page 2-24. |
| 6 | 162 | Code Mismatch | Go to "MAP 0130: Diskette Option" on page 2-24. |

## Notes

## MAP 0180: Fuse F1 (+5V)

**001**

**Are you here because fuse F1 is blowing?**

Yes No

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

- Turn the machine off.

***WW10 with Single board:***

- Disconnect J9 from the system board.
- Replace fuse F1.
- Turn the machine on.

***WW15:***

- Disconnect J15 from the function board.
- Replace fuse F1.
- Turn the machine on.

***Two board machines***

- Disconnect J5 from the motor control board.
- Replace fuse F1.
- Turn the machine on.

**Does fuse F1 blow again?**

Yes No

**004**

- Turn the machine off.
- Set your meter to the **RX100** scale.

***WW10 with Single board:***

- Measure the resistance between J9-2 (+5V) and J9-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J9-2 and the black meter lead (COM) connected to J9-8.

***WW15 with Single board:***

- Measure the resistance between J15-2 (+5V) and J15-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J15-2 and the black meter lead (COM) connected to J15-8.

***Two board machines***

- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-2 and the black meter lead (COM) connected to J5-8.

**Is the resistance less than 500 ohms?**

Yes No

**005**

Go to Step 008 on page 2-55.

**006**

(Step 006 continues)

**006** (continued)
***Single board machines:*** The function board is failing.
***Two board machines:*** The motor control board is failing.

**007**

The power supply assembly is failing.

**008**

(From step 005)
***WW10 with Single board:***
- Connect J9 to the system board.
- Turn the machine on.

***WW15:***
- Connect J15 to the function board.
- Turn the machine on.

***Two board machines:***
- Connect J5 to the motor control board.
- Turn the machine on.

**Does fuse F1 blow again?**
**Yes No**

**009**

Go to "MAP 0100: Start" on page 2-4.

**010**

***Single board machines:*** The function board is failing.
***Two board machines:*** The motor control board is failing.
– or –
The function board is failing.

## MAP 0190: Homing Sensor, Carrier

**Note:** Wheelwriter 50 and 5000 will not operate without a printwheel installed.

Wheelwriter 70 and 7000: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

- Turn the machine off.
- Turn the machine on.

**WW10, 15, 1500, 3000 - Does the machine display an error code of 6 beeps and LEDs 1, 2, 3 blinking?**
**WW30, 35, 50, 70, 3500, 5000, 7000 - Does the machine display a 215 error code?**

**Yes No**

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

**Is the homing sensor flag broken?**

**Yes No**

**004**

Go to Step 006.

**005**

Replace the homing sensor flag.

---

**006**

(From step 004)

- Turn the machine off.
- Push the carrier to the left side frame.

**Does the homing sensor flag contact the left side frame?**

**Yes No**

**007**

Go to "MAP 0580: Transport" on page 2-222.

**008**

- Turn the machine off.
- Observe the POR sequence as you turn the machine on.

**Does the carrier move at all?**

**Yes No**

**009**

Go to "MAP 0580: Transport" on page 2-222.

**010**

(Step **010** continues)

**010** (continued)

**Does the printwheel move at all?**

**Yes No**

**011**

Go to "MAP 0520: Selection" on page 2-198.

**012**

- Turn the machine off.
- Move the printwheel 5 to 10 petals away from the home position.
- Turn the machine on.

**Does the printwheel home?**

**Yes No**

**013**

***Single board machines:*** Go to "MAP 0200: Homing Sensor, Printwheel — Single Board Machines" on page 2-58.

***Two-board machines:*** Go to "MAP 0210: Homing Sensor, Printwheel — Two Board Machines" on page 2-66.

**014**

- Turn the machine off.
- Push the carrier to the center of the machine.
- Turn the machine on.

**Does the carrier move to the left side frame and then to the home position?**

**Yes No**

**015**

Go to "MAP 0580: Transport" on page 2-222.

**016**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0200: Homing Sensor, Printwheel — Single Board Machines

**Note:** Wheelwriter 50 and 5000 will not operate without a printwheel installed.

Wheelwriter 70 and 7000: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

**Is a known good printwheel available?**

**Yes No**

**002**

Go to Step 006.

**003**

- Try a known good printwheel in the machine.

**Does the machine operate correctly now?**

**Yes No**

**004**

Go to Step 006.

**005**

The original printwheel is failing.

---

**006**

(From steps 002 and 004)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes are open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)

**Is the printwheel good?**

**Yes No**

**007**

The printwheel is failing.

**008**

- Turn the machine off.
- Carefully check the carrier cable for cracks, wear, and damaged edges.

**Is the cable damaged?**

**Yes No**

**009**

Go to Step 011 on page 2-59.

**010**

The carrier cable is failing.

**011**

(From step 009)
- Carefully install the cable.
- Check the cable for proper alignment and fit.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

**012**

Go to "MAP 0100: Start" on page 2-4.

**013**

- Check the homing LED cable at the carrier cable board to make sure it is not loose and fits properly.

**Does the cable fit properly?**

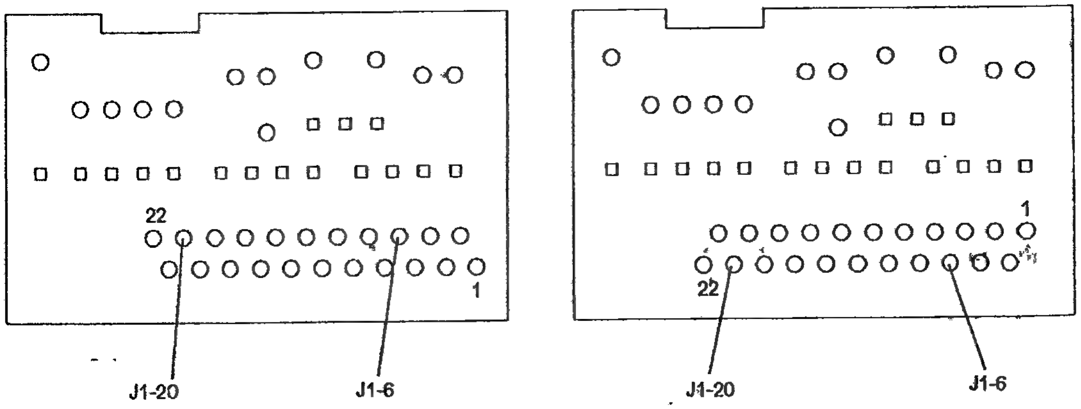
**Yes No**

**014**

Repair as necessary.

**015**

- Remove the printwheel.
- Measure the voltage between J1-20 and J1-6 (GND) on the carrier cable board as you slowly push the homing sensor flag in and out.



Level 1

Level 2

**Does the voltage change?**

**Yes No**

**016**

**Is the voltage between 4.5 V dc and 5.5 V dc?**

**Yes No**

**017**

- Turn the machine off.
- Disconnect the carrier cable from the carrier cable board.

(Step **017** continues)

**017** (continued)
- Turn the machine on.
- Measure the voltage at lines 20 and 6 of the carrier cable board end of the carrier cable.

**Is the voltage between 4.5 V dc and 5.5 V dc?**

**Yes No**

**018**

- Remove the carrier cable.
- Check the continuity of lines 6 and 20 in the carrier cable.

**019**

**Is there continuity?**

**Yes No**

**020**

The carrier cable is failing.

**021**

The system board is failing.

---

**022**

Go to Step 024.

---

**023**

Go to "MAP 0520: Selection" on page 2-198.

---

**024**

(From step 022)
- Turn the machine off.
- If it has been disconnected, reinstall the carrier cable to the carrier cable board.
- Disconnect the carrier cable from the system board.
- Set the meter to the **RX1K** scale.
- Set the polarity switch to +.
- Measure the resistance as indicated below.

| Meter Lead | System Board End of Carrier Cable | Reading |
|---|---|---|
| COM<br>VOM | Pin-6<br>Pin-22 | 10K to 80K Ohms |
| COM<br>VOM | Pin-22<br>Pin-6 | 500K Ohms or more |

(Step **024** continues)

**024** (continued)

**Are the measurements correct?**

**Yes No**

**025**

Go to Step 027.

**026**

Go to Step 035 on page 2-62.

---

**027**

(From step 025)

- Disconnect the homing LED from the carrier cable board.
- Measure the resistance between the red and black leads on the homing LED connector.

| Meter Lead | Homing LED Cable | Reading |
|---|---|---|
| COM | Pin-1 (red) | 10K to 80K Ohms |
| VOM | Pin-2 (black) | |
| COM | Pin-2 (black) | 500K Ohms or more |
| VOM | Pin-1 (red) | |

**Are the measurements correct?**

**Yes No**

**028**

The LED is failing.

**029**

- Disconnect the carrier cable at the carrier cable board.
- Measure continuity between the following points on the carrier cable board:
  - J6 Pin 1 and carrier cable connector Pin 22.
  - J6 Pin 2 and carrier cable connector Pin 6.

**Is there continuity?**

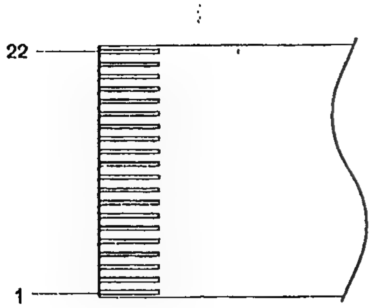
**Yes No**

**030**

The carrier cable board is failing.

**031**

- Check the continuity of lines 6 and 22 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**032**

The carrier cable is failing.

**033**

- Reinstall the carrier cable on the carrier cable board and on the the system board.
- Reinstall the homing LED cable.
- Turn the machine on.

**Does the machine still have the same symptom?**

**Yes No**

**034**

Go to "MAP 0100: Start" on page 2-4.

**035**

(From step 026)

- Turn the machine off.
- If the carrier cable is disconnected from the system board, reinstall it.
- Measure the resistance between the following points on the carrier cable board.

| Meter Lead | Carrier Cable Connector | Reading |
|---|---|---|
| VOM<br>COM | Pin-20<br>Pin-7 | 4K to 12K Ohms |
| VOM<br>COM | Pin-20<br>Pin-6 | 4K to 12K Ohms |
| VOM<br>COM | Pin-7<br>Pin-20 | 4K to 12K Ohms |
| VOM<br>COM | Pin-6<br>Pin-20 | 4K to 12K Ohms |
| VOM<br>COM | Pin-7<br>Pin-6 | 0.5K to 1.0K Ohms |
| VOM<br>COM | Pin-6<br>Pin-7 | 0.5K to 1.0K Ohms |

(Step 035 continues)

035 (continued)

**Are the measurements correct?**

**Yes No**

036

Go to Step 046 on page 2-64.

037

- Remove the carrier.
- Check the homing sensor and LED assembly for ribbon particles, paper dust, and obstructions.

**Are the homing sensor and LED assembly clean?**

**Yes No**

038

- Clean as necessary.
- Install the carrier.

Go to "MAP 0100: Start" on page 2-4.

039

- Check the position of the sensor.

**Is the sensor assembly firmly mounted to the selection plate?**

**Yes No**

040

Repair as necessary.

041

- Install the carrier.
- Turn the machine on.

**Does the machine still have the original symptom?**

**Yes No**

042

Go to "MAP 0100: Start" on page 2-4.

043

- Check the selection motor.

**Are the selection motor mounting screws tight and is the selection motor bias spring in place?**

**Yes No**

044

Repair as necessary.

045

The homing sensor is failing.

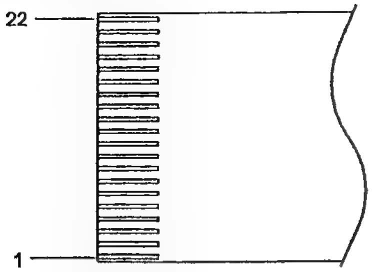
---

046

(Step 046 continues)

**046** (continued)
(From step 036)

- Check the continuity of lines 6, 7, and 20 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**047**

The carrier cable is failing.

**048**

- Remove the carrier from the machine.
- Check the continuity of the carrier cable board from the carrier cable board connector, pins 6, 7, and 20 to the homing sensor connector.

**Is there continuity?**

**Yes No**

**049**

The carrier cable board is failing.

**050**

- Reconnect the homing sensor cable.
- Be sure the carrier cable is properly connected to the carrier cable board and the system board.
- Install the carrier.
- Turn the machine on.

**Does the machine still have the original symptom?**

**Yes No**

**051**

Go to "MAP 0100: Start" on page 2-4.

**052**

The selection plate assembly is failing.

## Notes

## MAP 0210: Homing Sensor, Printwheel — Two Board Machines

**Note:** Wheelwriter 50 will not operate without a printwheel installed.

Wheelwriter 70 only: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

**Is a known good printwheel available?**

**Yes** **No**

**002**

Go to Step 006.

**003**

- Try a known good printwheel in the machine.

**Does the machine operate correctly now?**

**Yes** **No**

**004**

Go to Step 006.

**005**

The original printwheel is failing.

---

**006**

(From steps 002 and 004)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)

**Is the printwheel good?**

**Yes** **No**

**007**

The printwheel is failing.

**008**

- Turn the machine off.
- Carefully check the 16- and 22-pin cables between the motor control board and the function board for cracks, breaks, wear, and damaged edges.

**Is either cable damaged?**

**Yes** **No**

**009**

Go to Step 015 on page 2-67.

**010**

(Step **010** continues)

**010** (continued)

- Replace the damaged cable.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

**011**

Go to "MAP 0100: Start" on page 2-4.

**012**

- Turn the machine off.
- Carefully check the carrier cable for cracks, wear, and damaged edges.

**Is the cable damaged?**

**Yes No**

**013**

Go to Step 015.

**014**

Replace the carrier cable.

---

**015**

(From steps 009 and 013)

- Carefully install the cables.
- Check the cables for proper alignment and fit.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

**016**

Go to "MAP 0100: Start" on page 2-4.

**017**

- Check the homing LED cable at the carrier cable board to make sure it is not loose and fits properly.

**Does the cable fit properly?**

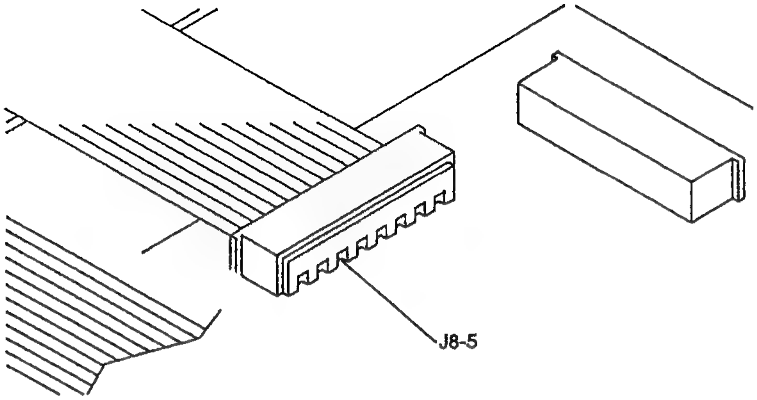
**Yes No**

**018**

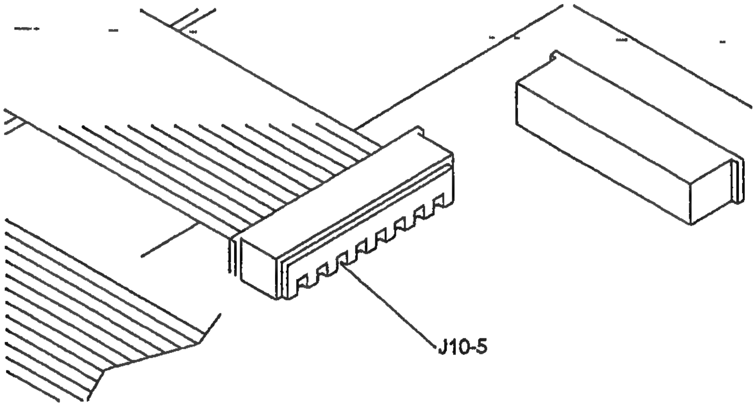
Repair as necessary.

**019**

- WW10 - Measure the voltage at J8-5 on the function board as you slowly push the homing sensor flag in and out.



- WW30, 50, 70 - Measure the voltage at J10-5 on the function board as you slowly push the homing sensor flag in and out.



**Does the voltage change?**

**Yes No**

**020**

- Turn the machine off.

***WW10:***

- Disconnect the 16-pin cable from J8 on the function board.
- Turn the machine on.
- Measure the voltage at J8-5.

***WW30, 50, 70:***

- Disconnect the 16-pin cable from J10 on the function board.
- Turn the machine on.
- Measure the voltage at J10-5.

**Is the voltage between 4.5 V dc and 5.5 V dc?**

**Yes No**

**021**

The function board is failing.

022

Go to Step 024.

---

023

WW10 - Go to "MAP 0520: Selection" on page 2-198.
WW30, 50, 70:
The 22-pin cable between the function board and the motor control board is failing.
— or —
The function board is failing.
— or —
The motor control board is failing.

---

024

(From step 022)

- Turn the machine off.
- Disconnect the carrier cable from the motor control board.
- Turn the machine on
- Measure the voltage at J2-20 on the motor control board.

**Is the voltage between 4.5 V dc and 5.5 V dc?**

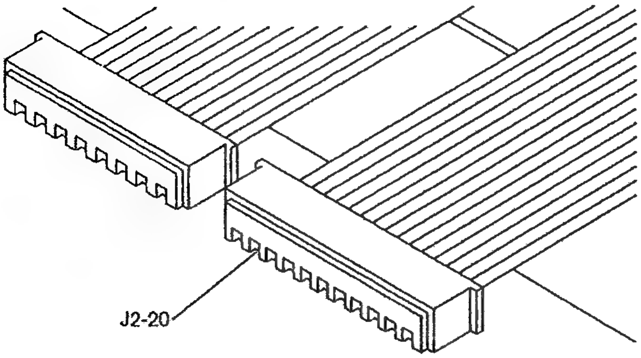
**Yes No**

025

The motor control board is failing.

026

- Turn the machine off.
- Connect the carrier cable.
- Turn the machine on.
- Measure the voltage at J2-20 on the function board as you slowly push the homing sensor flag in and out.



**Does the voltage change?**

**Yes No**

027

Go to Step 031 on page 2-70.

**028**

- Turn the machine off.
- Turn the machine on.

**Do you still have the same symptom?**

**Yes No**

**029**

Go to "MAP 0100: Start" on page 2-4.

**030**

The 22-pin cable is failing.

— or —

The 16-pin cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

---

**031**

(From step 027)

- Turn the machine off.
- Set the meter to the **RX1K** scale.
- Set the polarity switch to +.
- Measure the resistance as indicated below.

| Meter Lead | Motor Control Board End of Carrier Cable | Reading |
|---|---|---|
| COM<br>VOM | Pin-6<br>Pin-22 | 10K to 80K Ohms |
| COM<br>VOM | Pin-22<br>Pin-6 | 500K Ohms or more |

**Are the measurements correct?**

**Yes No**

**032**

Go to Step 034.

**033**

Go to Step 042 on page 2-72.

---

**034**

(From step 032)

- Disconnect the homing LED from the carrier cable board.
- Measure the resistance between the red and black leads on the homing LED connector.

| Meter Lead | Homing LED Cable | Reading |
|---|---|---|
| COM<br>VOM | Pin-1 (red)<br>Pin-2 (black) | 10K to 80K Ohms |
| COM<br>VOM | Pin-2 (black)<br>Pin-1 (red) | 500K Ohms or more |

**Are the measurements correct?**

**Yes No**

**035**

The LED is failing.

**036**

- Check the continuity of the carrier cable board.

**Is there continuity?**

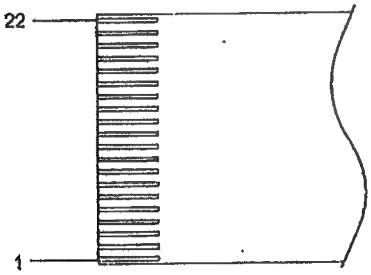
**Yes No**

**037**

The carrier cable board is failing.

**038**

- Check the continuity of lines 6 and 22 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**039**

The carrier cable is failing.

**040**

- Reinstall the carrier cable on the carrier cable board and the motor control board.
- Reinstall the homing LED cable.
- Turn the machine on.

(Step **040** continues)

**040** (continued)

**Do you still have the same symptom?**

**Yes No**

**041**

Go to "MAP 0100: Start" on page 2-4.

**042**

(From step 033)

- Measure the resistance as indicated in the following chart.

| Meter Lead | Motor Control Board End of Carrier Cable | Reading |
|---|---|---|
| VOM<br>COM | Pin-20<br>Pin-7 | Greater than 500K Ohms |
| VOM<br>COM | Pin-20<br>Pin-6 | Greater than 500K Ohms |
| VOM<br>COM | Pin-7<br>Pin-20 | Greater than 500K Ohms |
| VOM<br>COM | Pin-6<br>Pin-20 | 30K to 50K Ohms |
| VOM<br>COM | Pin-7<br>Pin-6 | Greater than 500K Ohms |
| VOM<br>COM | Pin-6<br>Pin-7 | 30K to 50K Ohms |

**Are the measurements correct?**

**Yes No**

**043**

Go to Step 051 on page 2-73.

**044**

- Remove the carrier.
- Check the homing sensor and LED assembly for ribbon particles, paper dust, and obstructions.

**Are the homing sensor and LED assembly clean?**

**Yes No**

**045**

- Clean as necessary.
- Install the carrier.

Go to "MAP 0100: Start" on page 2-4.

**046**

- Check the position of the sensor.

(Step **046** continues)

046 (continued)

**Is the sensor assembly firmly mounted to the selection plate?**

**Yes No**

**047**

Repair as necessary.

**048**

- Install the carrier.
- Turn the machine on.

**Do you still have the original symptom?**

**Yes No**

**049**

Go to "MAP 0100: Start" on page 2-4.

**050**

The function board is failing.

— or —

The selection plate assembly is failing.

— or —

The LED assembly is failing.

— or —

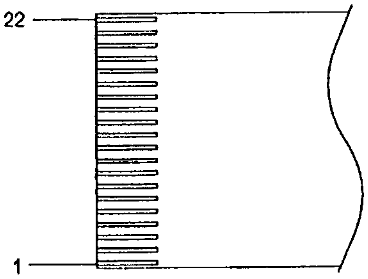
The motor control board is failing.

---

**051**

(From step 043)

- Check the continuity of lines 6, 7 and 20 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**052**

The carrier cable is failing.

**053**

- Remove the carrier from the machine.
- Check the continuity from the carrier cable board.

(Step **053** continues)

053 (continued)

- Check from the carrier cable board connector, pins 6, 7, and 20 to the homing sensor connector.

**Is there continuity?**

**Yes No**

054

The carrier cable board is failing.

055

- Reconnect the homing sensor cable.
- Be sure the carrier cable is properly connected to the carrier cable board.
- Install the carrier.
- Turn the machine on.

**Do you still have the original symptom?**

**Yes No**

056

Go to "MAP 0100: Start" on page 2-4.

057

The function board is failing.

— or —

The selection plate assembly is failing.

— or —

The LED assembly is failing.

— or —

The motor control board is failing.

## Notes

## MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000

**001**

- Turn the machine off.
- Turn the machine on.

**Do all the indicator panel LEDs turn on during POR?**

Yes No

**002**

**Do any indicator panel LEDs turn on during POR?**

Yes No

**003**

Go to Step 008.

**004**

***System board machines:***

- Turn the machine off.
- Disconnect J4 from the system board.
- Turn the machine on.
- Measure the voltage on the J4 plug between J4-1 (+5 V dc) and J4-2 (gnd).

***Two-Board machines:***

- Turn the machine off.
- Disconnect J5 from the function board.
- Turn the machine on.
- Measure the voltage on the J5 plug between J5-1 (+5 V dc) and J5-9 (gnd).

**Is the voltage between 4.5 V dc and 5.5 V dc?**

Yes No

**005**

The function board is failing.

**006**

The indicator panel is failing.

---

**007**

**Do all the LEDs turn off during POR?**

Yes No

**008**

***System board machines:***

- Turn the machine off.
- Disconnect J4 from the system board.
- Turn the machine on.
- Measure the voltage on the J4 plug between J4-1 (+5 V dc) and J4-9 (gnd) as you press the keybutton that turns on the failing LED.

***Two-board machines:***

- Turn the machine off.

(Step **008** continues)

**008** (continued)

- Disconnect J5 from the function board.
- Turn the machine on.
- Measure the voltage on the J5 plug between J5-1 (+5 V dc) and J5-9 (gnd) as you press the keybutton that turns on the failing LED.

**Does the voltage go from 4.5 V dc to 5.5 V dc?**

Yes No

**009**

The function board or system board is failing.

**010**

The indicator panel is failing.

---

**011**

**Does one of the line space indicators come on after POR?**
**The indicator that comes on depends on which one was on the last time the machine was turned on.**

Yes No

**012**

***System Board machines:*** The system board is failing.
***Two-Board machines:*** The function board is failing.

**013**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000

**001**

- Turn the machine off.
- Turn the machine on.
- Carefully observe the POR sequence. You may have to turn the machine off and on several times to verify a specific step. Wait at least 30 seconds between each POR.

**Does the machine complete the POR?**

Yes No

**002**

**Are any or all indicator panel LEDs flashing?**

Yes No

**003**

Go to Step 006.

**004**

Go to "MAP 0170: Error Codes" on page 2-48.

---

**005**

Go to "MAP 0100: Start" on page 2-4.

---

**006**

(From step 003)

**Do all the LEDs turn on?**

Yes No

**007**

Go to Step 009.

**008**

Go to Step 012 on page 2-79.

---

**009**

(From step 007)

**Do any indicator panel LEDs turn on?**

Yes No

**010**

Go to Step 012 on page 2-79.

**011**

Go to Step 015 on page 2-79.

---

**012**

(From steps 008 and 010)

**Does the machine complete the POR except for the LEDs turning on?**

**Yes No**

**013**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

**014**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

---

**015**

(From step 011)

**Do all the LEDs turn on and remain on?**

**Yes No**

**016**

**Do all the LEDs turn off and remain off?**

**Yes No**

**017**

Go to Step 020.

**018**

Go to Step 025 on page 2-80.

**019**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

---

**020**

(From step 017)

— Try to turn on the line space 1 LED by pressing the line space keybutton.

**Does any LED other than the line space 1 remain on?**

**Yes No**

**021**

**Does any LED stay off during POR?**

**Yes No**

**022**

Go to Step 030 on page 2-80.

**023**

Go to Step 036 on page 2-81.

**024**

Go to Step 033.

---

**025**

(From step 018)

- Press the line space keybutton 3 to 4 times.

**Do any of the line space LEDs turn on?**

Yes No

**026**

- Press each character keybutton.

The printwheel should turn, the print hammer should energize, or the character should print.

**Do the electronics sense any keybutton?**

Yes No

**027**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

**028**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

**029**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

---

**030**

(From step 022)

**Do any LEDs turn on and off at random?**

Yes No

**031**

Go to Step 039 on page 2-81.

**032**

The function board is failing.

---

**033**

(From step 024)

**Does the machine complete the POR except for an LED other than the line space 1 LED remaining on?**

Yes No

**034**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

**035**

(Step **035** continues)

**035** (continued)
Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

---

**036**

(From step 023)
The symptom may change.
— Try to get the symptom to change by turning the machine off and on several times.

**Do you have the same symptom?**
**Yes No**

**037**

The function board is failing.

**038**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

---

**039**

(From step 031)
**Does the machine beep one time?**
**Yes No**

**040**

**Does the machine complete the POR except for the beep?**
**Yes No**

**041**

Go to Step 045.

**042**

***System board machines:*** The function board is failing.
***Two-board machines:***
— Check the continuity of the 16-pin cable between the motor control board and the function board.

**Is there continuity?**
**Yes No**

**043**

The 16-pin cable is failing.

**044**

The function board is failing.

---

**045**

(From step 041)
(Step **045** continues)

**045** (continued)

**Does the printwheel rotate slightly?**

**Yes No**

**046**

**Does the machine complete POR except for the printwheel turning?**

**Yes No**

**047**

Go to Step 049.

**048**

Go to "MAP 0520: Selection" on page 2-198.

---

**049**

(From step 047)

**Does the printwheel make approximately 3 revolutions?**

**Yes No**

**050**

Go to "MAP 0520: Selection" on page 2-198.

**051**

**Does the ribbon plate move up, then down?**

**Yes No**

**052**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**053**

**Does the ribbon feed one time?**

**Yes No**

**054**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**055**

- Turn the machine off.
- Move the carrier to the right side frame.
- Turn the machine on.

**Does the carrier move to the left frame then to the right?**

**Yes No**

**056**

(Step **056** continues)

056 (continued)

**Does the carrier continue to drive into the left frame?**

**Yes No**

**057**

Go to Step 060.

**058**

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

**059**

Go to Step 065.

**060**

(From step 057)

**Does the carrier continue to drive into the right frame?**

**Yes No**

**061**

The carrier may or may not move.

**Is the transport motor noisy?**

**Yes No**

**062**

Go to Step 065.

**063**

Go to "MAP 0580: Transport" on page 2-222.

**064**

Go to "MAP 0520: Selection" on page 2-198.

**065**

(From steps 059 and 062)

**Does the platen move slightly down, then up?**

**Yes No**

**066**

Go to "MAP 0390: Paperfeed" on page 2-156.

**067**

(Step **067** continues)

**067** (continued)
**Does the print hammer operate one time?**
**Yes No**

**068**

Go to Step 072.

**069**

**Does the print hammer hit too hard or remain energized?**
**Yes No**

**070**

Go to Step 074.

**071**

The Function Board is failing.

---

**072**

(From step 068)
**Does the print hammer energize?**
**Yes No**

**073**

Go to "MAP 0470: Print Quality" on page 2-184.

**074**

(From step 070)
**Are all the line space LEDs off except one?**
**Yes No**

**075**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

**076**

- Press the line space keybutton 3 or 4 times.

**Do the line space LEDs change each time you press the keybutton?**
**Yes No**

**077**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

**078**

- Put a sheet of paper in the machine. If the SAPI does not work, pull the paper release lever forward and slide the paper in.
- Press each character keybutton from a to z. Look for a change in the LEDs, motor movement, solenoid operation, or beeps as an indication that the function board or system board senses the keybutton is being pressed.

(Step **078** continues)

078 (continued)

**Does the function board or system board sense any keybutton?**

**Yes No**

**079**

Go to "MAP 0260: Keyboard" on page 2-96.

**080**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

**001**

- Turn the machine off.
- Turn the machine on.
- Carefully observe the POR sequence. You may have to turn the machine off and on several times to verify a specific step. Wait at least 30 seconds between each POR.

**Does the machine complete the POR?**

Yes No

**002**

**Is there an error indication on the display?**

Yes No

**003**

Go to Step 006.

**004**

Go to "MAP 0170: Error Codes" on page 2-48.

---

**005**

Go to "MAP 0100: Start" on page 2-4.

---

**006**

(From step 003)

WW70, 7000 — The CRT screen should be dark when the power is first turned on and then the IBM Logo screen should appear.

WW50, 5000 — The CRT screen should be dark with a blinking cursor when the power is first turned on.

**WW30, 35, 3500 - Is the display blank (No PELS on)?**
**WW50, 5000 - Does the blinking cursor display?**
**WW70, 7000 - Does the IBM Logo screen display?**

Yes No

**007**

WW30, 35, 3500 - Go to "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.
WW50, 70, 5000, 7000 - Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.

**008**

**Does the printwheel rotate slightly?**

Yes No

**009**

Go to "MAP 0520: Selection" on page 2-198.

**010**

(Step **010** continues)

010 (continued)

**Does the printwheel move approximately 3 revolutions?**

**Yes No**

**011**

Go to "MAP 0520: Selection" on page 2-198.

**012**

**Does the carrier move?**

**Yes No**

**013**

Go to "MAP 0580: Transport" on page 2-222.

**014**

**Does the platen move slightly down then up?**

**Yes No**

**015**

Go to "MAP 0390: Paperfeed" on page 2-156.

**016**

**Does the print hammer operate one time? (May be difficult to see)**

**Yes No**

**017**

Go to Step 021.

**018**

**Does the print hammer hit too hard or remain energized?**

**Yes No**

**019**

Go to Step 023 on page 2-88.

**020**

The function board is failing.

---

**021**

(From step 017)

**Does the print hammer energize?**

**Yes No**

**022**

Go to "MAP 0470: Print Quality" on page 2-184.

**023**

(From step 019)

**Does the carrier move to the right?**

**Yes No**

**024**

- Turn the machine off.
- Push the carrier to the center of the machine.
- Turn the machine on.

**Does the carrier move to the right?**

**Yes No**

**025**

Go to "MAP 0580: Transport" on page 2-222.

**026**

Go to Step 027.

**027**

(From step 026)

**Does the carrier continue to drive into the right frame?**

**Yes No**

**028**

The carrier may or may not move.

**Does the transport motor hum, buzz or make other noises?**

**Yes No**

**029**

Go to Step 032.

**030**

Go to "MAP 0580: Transport" on page 2-222.

**031**

Go to "MAP 0520: Selection" on page 2-198.

**032**

(From step 029)

**Does the printwheel home?**

**Yes No**

**033**

***Single board machines:***

(Step 033 continues)

033 (continued)
Go to "MAP 0200: Homing Sensor, Printwheel — Single Board Machines" on page 2-58.
*Two-board machines:*
Go to "MAP 0210: Homing Sensor, Printwheel — Two Board Machines" on page 2-66.

034

**Does the ribbon move up and down then home?**
**Yes No**

035

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

036

**Does the ribbon move one time?**
**Yes No**

037

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

038

**Does the carrier move to the left and continue to drive into the left frame?**
**Yes No**

039

**Does the carrier home?**
**Yes No**

040

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

041

WW30, 35, 3500 - Go to Step 043.
WW50, 70, 5000, 7000 - Go to Step 063 on page 2-91.

042

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

043

(From step 041)
**Does the machine beep one time?**
**Yes No**

044

(Step 044 continues)

044 (continued)

**Does the machine complete POR except for beeping one time?**

**Yes No**

**045**

Go to Step 047.

**046**

The 16-pin cable is failing.

– or –

The function board is failing.

– or –

The motor control board is failing.

**047**

(From step 045)

**Is spell check installed?**

**Yes No**

**048**

Go to Step 054.

**049**

The machine may beep two times.(The sound will depend on how the operator has set code + 4.

**Does the machine beep two times?**

**Yes No**

**050**

Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

**051**

**Does the machine beep 3 times?**

**Yes No**

**052**

Go to Step 054.

**053**

Go to "MAP 0110: Battery Backup" on page 2-16.

**054**

(From steps 048 and 052)

(Step 054 continues)

054 (continued)

**Is the diskette option installed?**

Yes No

**055**

Go to Step 058.

**056**

**Does the diskette initialize?**

Yes No

**057**

Go to "MAP 0130: Diskette Option" on page 2-24.

**058**

(From step 055)

**Does either of the following appear on the display:**

- **The cursor, linespace symbol and linespace number (Warm start)**
- **Storage cleared, linespace symbol and linespace number (Cold start)?**

**Note: Some coded functions may also appear on the display if they have been previously stored.**

Yes No

**059**

**Does an error code appear on the display?**

Yes No

**060**

Go to "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.

**061**

Go to "MAP 0170: Error Codes" on page 2-48.

**062**

POR is complete, if you still have a problem, go to "MAP 0100: Start" on page 2-4.

**063**

(From step 041)

**Do the screens change?**

- **WW 70, 7000 — Logo screen goes off and Copyright screen comes on.**
- **WW 50, 5000 — Blinking cursor goes off and left margin indicator appears in lower left corner.**

Yes No

**064**

(Step 064 continues)

064 (continued)
Go to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**065**

- If your machine is a WW50 or 5000 go to Step 069.
- If your machine is a WW70 or 7000, continue with this step.

**Does the machine beep one time?**

**Yes No**

**066**

**Does the machine complete POR except for beeping one time?**

**Yes No**

**067**

Go to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**068**

The 16-pin Cable is failing.
– or –
The function board is failing.
– or –
The motor control board is failing.

---

**069**

(From step 065)

**WW70, 7000 – Does the machine beep 3 times and display a blinking Battery indicator?**

**WW50, 5000 – Does the machine beep 3 times and display a LOW BAT indicator?**

**Yes No**

**070**

Go to Step 072.

**071**

Go to "MAP 0110: Battery Backup" on page 2-16.

---

**072**

(From step 070)

**Is the diskette option installed?**

**Yes No**

**073**

Go to Step 076 on page 2-93.

**074**

(Step 074 continues)

**074** (continued)

**Does the diskette initialize?**

**Yes No**

**075**

Go to "MAP 0130: Diskette Option" on page 2-24.

**076**

(From step 073)

**WW70, 7000 — Does the typewriter screen appear on the display?**

**WW50, 5000 — Does the margin scale screen appear on the display?**

**Yes No**

**077**

**Does an error code appear on the display?**

**Yes No**

**078**

Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.

**079**

Go to "MAP 0170: Error Codes" on page 2-48.

**080**

POR is complete, if you still have a problem, go to "MAP 0100: Start" on page 2-4.

## MAP 0250: Intermittent Failure

**Note:** Play-in-loop may help you locate an intermittent failure. Intermittent dead machine can be caused by a loose line cord or loose cables. Try to duplicate the failure by moving the cables. Check for loose, shorted or corroded pins, connector, line cord, and cables before you replace any parts. Also check the carrier cable and the short cables connecting the electronic boards for damage.

CAUTION:

**The cables between the motor control board and the function board must be installed correctly. The cables must be fully seated and the lines of the cables must align correctly with the pins in the board connectors. Ensure the carrier cable is also installed correctly.**

**001**

**Is this the first call for this symptom?**

**Yes No**

**002**

Go to Step 004.

**003**

Try to recreate the failure.

---

**004**

(From step 002)

- Locate the symptom in the following chart.
- See the diagnostic listed.
- If you have already replaced a FRU, replace the next most probable FRU until the machine is fixed.

This chart lists the FRUs in the most probable order of failure.

| SYMPTOM | 1 | 2 | 3 | 4 | SEE THESE DIAGNOSTICS |
|---|---|---|---|---|---|
| Dead Machine | P | K | C | D | "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116<br>"MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120<br>"MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126 |
| Fuses Blown | B | D | C |  | "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116<br>"MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120<br>"MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126 |
| Homing Sensor Failure | F | D | A |  | "MAP 0190: Homing Sensor, Carrier" on page 2-56 |
| Incomplete POR | F | B | D | C | "MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000" on page 2-78 |
| Indicator Panel Failure | D | L |  |  | "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76 |
| Display Failure | D | R |  |  | "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32 |

| SYMPTOM | 1 | 2 | 3 | 4 | SEE THESE DIAGNOSTICS |
|---|---|---|---|---|---|
| CRT Failure | D | S |  |  | "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20 |
| Keyboard Failure | M | D |  |  | "MAP 0260: Keyboard" on page 2-96 |
| Memory Failures | O | D | C |  | "MAP 0110: Battery Backup" on page 2-16 |
| Paperfeed Failure | B | E | Q |  | "MAP 0390: Paperfeed" on page 2-156 |
| Print Hammer Failure | F | B | D | G | "MAP 0460: Print Hammer Solenoid" on page 2-180 |
| Ribbon Failure | H | B | D |  | "MAP 0490: Ribbon and Correcting Tape" on page 2-190 |
| Selection Failure | F | I | B | G | "MAP 0520: Selection" on page 2-198 |
| Transport Failure | J | B | D | C | "MAP 0580: Transport" on page 2-222 |

|  |  |  |  |
|---|---|---|---|
| A Homing LED | D Function Board | G Carrier Cable | J Transport Asm |
| B Motor Control Board or System Board | E Paperfeed Motor | H Lift Motor or Ribbon Plate | K Line Cord or On/Off Switch |
| C Power Supply | F Selection Plate | I Printwheel | L Indicator Panel |
| M Keyboard | N Carrier Cable Board | O Batteries | P Primary Fuse |
| Q Paperfeed Motor Cable | R Display | S CRT |  |

# MAP 0260: Keyboard

**001**

- Turn the machine off.
- Disconnect the keyboard mylar tabs from the function board.
- Check the nylon tabs for damage (silver paint scraped off, bent or broken tabs,

**Are the tabs damaged?**

**Yes No**

**002**

**Were you sent here from "MAP 0170: Error Codes" on page 2-48?**

**Yes No**

**003**

Go to Step 011 on page 2-97.

**004**

- Ensure the keyboard, (part number and machine type), is correct for your machine. See "Keyboard Identification Hole Charts" on page 2-228.

**Is the correct keyboard installed?**

**Yes No**

**005**

Inform the customer an incorrect keyboard is installed.

**006**

Go to Step 008.

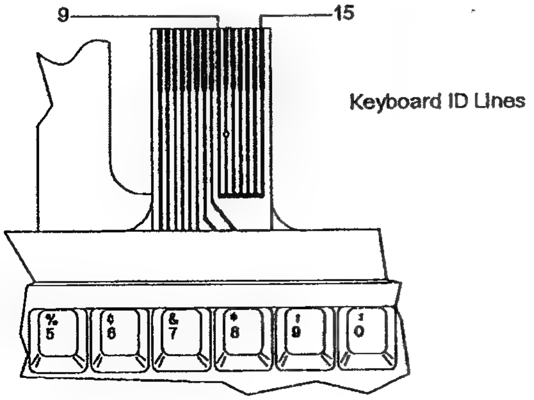
**007**

The keyboard is failing.

**008**

(From step 006)

- Check the keyboard cable ID lines for continuity between line 15 and lines 10 to 14. If a hole is punched in an ID line on the tab, the meter should indicate infinity for that line. If the ID lines have been cut away and replaced by the language modification comb, refer to the "Keyboard Identification Hole Charts" on page 2-228 to verify that the correct teeth of the comb have been removed.



**Is there continuity, or were the correct comb teeth removed?**

**Yes No**

**009**

Refer to "Keyboard Country ID Modification" on page 2-232 and install a correct keyboard language modification comb.

**010**

The function board is failing.

---

**011**

(From step 003)

**Is only one keybutton failing?**

**Yes No**

**012**

The keyboard is failing.

– or –

The function board is failing.

**013**

**Does the code keybutton work correctly?**

**Yes No**

**014**

The keyboard is failing.

– or –

The function board is failing.

**015**

**Does the shift keybutton work correctly?**

**Yes No**

**016**

The keyboard is failing.

– or –

The function board is failing.

**017**

The keyboard is failing.

## MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000

**CAUTION:**

***Two-board machines:*** **The cables between the motor control board and the function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly.**

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

**Is the machine totally inoperative (no LEDs on, no motor movement, no beep, no solenoid operation, and no printwheel movement)?**

**Yes No**

**002**

**Does the machine complete POR?**

**Yes No**

**003**

Go to Step 006.

**004**

Go to Step 041 on page 2-102.

---

**005**

***Single board machines:***

Go to Step 026 on page 2-100.

***Two-board machines:***

Go to Step 018 on page 2-100.

---

**006**

(From step 003)

- Turn the machine off.
- Turn the machine on.

**Does the machine lock up with all LEDs on solid?**

**Yes No**

**007**

- Check for a spell check option installed in the machine.

***WHEELWRITER 10 typewriter:***

- There will be a module in the U102 socket on the function board or system board and it can be removed.

***WHEELWRITER 15, 1500, 3000 typewriter:***

- There will be a module in the U3 socket on the system board.

(Step **007** continues)

**007** (continued)

**Is the Spell Check option installed in the machine?**

**Yes No**

**008**

Go to Step 013.

**009**

Go to Step 044 on page 2-103.

---

**010**

***Single board machines:***

The system board is failing.

***Two-board machines:***

Check the continuity of the 16-Pin cable between the motor control board and the function board.

**Is there continuity?**

**Yes No**

**011**

The 16-Pin cable is failing.

**012**

The function board is failing.

---

**013**

(From step 008)

**Does the machine lock up with all LEDs off?**

**Yes No**

**014**

**Does the machine lock up with random LEDs on?**

**Yes No**

**015**

***Single board machines:***

Go to Step 026 on page 2-100.

***Two-board machines:***

Go to Step 018 on page 2-100.

**016**

The function board or system board is failing.

---

**017**

The function board or system board is failing.

**018**

(From steps 005 and 015)
- Turn the machine off.
- Remove the 16-Pin cable between the function board and motor control board and check for cracks, wear, and broken or damaged outer edges.

**Is the cable good?**

Yes No

**019**

Replace the cable.

**020**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes No

**021**

~~Replace the 16-Pin Cable and go to "MAP 0100: Start" on page 2-4.~~

**022**

- Remove the 22-Pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

Yes No

**023**

Replace the cable.

**024**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes No

**025**

Replace the 22-Pin Cable and go to "MAP 0100: Start" on page 2-4.

**026**

(From steps 005 and 015)
- Turn the machine off.

***Single board machines:***
- Disconnect the carrier cable from the system board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

(Step 026 continues)

**026** (continued)

***Two-board machines:***

- Disconnect the carrier cable from the motor control board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

**Does the machine still have the same symptom?**

**Yes No**

**027**

Go to "MAP 0100: Start" on page 2-4.

**028**

- Turn the machine off.
- Carefully disconnect and connect the carrier cable to the system board or motor control board two or three times.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

**029**

Replace the carrier cable and go to "MAP 0100: Start" on page 2-4.

**030**

***Single board machines:***

***WHEELWRITER 10 typewriter:***

- Measure the voltage at the +5V dc test point on the system board.

***WHEELWRITER 15, 1500, 3000 typewriter:***

- Measure the voltage at connector J15 between Pin 1 (GND) and Pin 2 (+5 V dc) at the system board.

***Two-board machines:***

- Measure the voltage at the +5V dc test point on the motor control board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

**Yes No**

**031**

Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116.

**032**

***Single board machines:***

Go to Step 034 on page 2-102.

***Two-board machines:***

- Measure the voltage at the +5V dc test point on the function board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

**Yes No**

**033**

Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116.

**034**

- Turn the machine off.
- Disconnect the power supply connector from the motor control board or system board.
- Turn the machine on.
- Measure the following voltages on the power supply connector.

| Between | Reading |
|---|---|
| Pin 1(GND) and Pin 2 | +5VDC |
| Pin 3(GND) and Pin 4 | +5VDC |
| Pin 5(GND) and Pin 6 | +32VDC |
| Pin 7(GND) and Pin 8 | +32VDC |

**Are the voltages present?**
Yes No

**035**

The power supply is failing.

**036**

***Single board machines:***
The function board is failing.
***Two-board machines:***
- Check the continuity of the 16-Pin cable between the motor control board and the function board.

**Is there continuity?**
Yes No

**037**

The 16-Pin cable is failing.

**038**

- Replace the function board.

**Does the machine still have the same symptom?**
Yes No

**039**

Go to "MAP 0100: Start" on page 2-4.

**040**

- Reinstall the original function board.

The motor control board is failing.

---

**041**

(From step 004)
(Step **041** continues)

**041** (continued)

**Does the machine lock up when you type several lines?**

**Yes No**

**042**

Go to "MAP 0100: Start" on page 2-4.

**043**

The function board is failing.

---

**044**

(From step 009)

- Turn the machine off.
- Remove the Spell Check module from the function board or system board. Be sure to observe all ESD precautions.
- Turn the machine on.

**Does the machine still have the same symptom?**

**Yes No**

**045**

The Spell Check module is failing.

**046**

***Single board machines:*** The function board is failing.

***Two-board machines:***

- Check the continuity of the 16-Pin cable between the motor control board and the function board.

**Is there continuity?**

**Yes No**

**047**

The 16-Pin cable is failing.

**048**

- Replace the function board.

**Does the machine still have the same symptom?**

**Yes No**

**049**

Go to "MAP 0100: Start" on page 2-4.

**050**

- Reinstall the original function board.

The motor control board is failing.

## MAP 0280: Machine Electronics, Wheelwriter 30, 35, 3500

**CAUTION:**

**On two-board machines, the cables between the motor control board and the function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly.**

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

**Is the machine totally inoperative (Display off, no motor movement, no beep, no solenoid operation, and no printwheel movement)?**

**Yes No**

**002**

**Does the machine complete POR?**

**Yes No**

**003**

Go to Step 008.

**004**

Go to Step 032 on page 2-107.

---

**005**

If you have measured the power supply output voltage in a previous MAP, go to Step 015 on page 2-105. If you have not yet checked the power supply:

***Single board machines:*** Measure the voltage on the power supply plug at the function board between J15-1 (gnd) and J15-2 (+5 V dc).

***Two-board machines:*** Measure the voltage on the power supply plug at the motor control board between J5-1 (gnd) and J5-2 (+5 V dc).

**Is the voltage between 4.75 V dc and 5.25 V dc**

**Yes No**

**006**

Go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120.

**007**

Go to Step 015 on page 2-105.

---

**008**

(From step 003)

- Turn the machine off.
- Turn the machine on.

(Step 008 continues)

008 (continued)

**Does the machine go system busy with all PELs in the display turned on?**

**Yes No**

**009**

**Is Spell Check an option on your machine?**
**Answer yes only if modules U700 and U801 or module U200 (two board machines) or module U3 or U800 (single board machines) are socketed to the function board and can be removed.**

**Yes No**

**010**

Go to Step 015.

**011**

Go to Step 035 on page 2-107.

---

**012**

***Single board machines:*** The system board is failing.
***Two-board machines:*** Remove the 16-pin cable between the function board and the motor control board check the continuity of the cable.
**Is there continuity?**

**Yes No**

**013**

The 16-pin cable is failing.

**014**

The function board is failing.

---

**015**

(From steps 005 and 010)
***Single board machines:*** Go to Step 023 on page 2-106.
***Two-board machines:***

- Turn the machine off.
- Remove the 16-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

**Yes No**

**016**

Replace the cable.

**017**

- Install the cable.
- Be sure to check for proper alignment and fit.

(Step **017** continues)

**017** (continued)

**Does the machine still have the same symptom?**

**Yes No**

**018**

Replace the 16-pin cable and go to "MAP 0100: Start" on page 2-4.

**019**

- Remove the 22-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

**Yes No**

**020**

Replace the cable.

**021**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

**Yes No**

**022**

Replace the 22-pin cable and go to "MAP 0100: Start" on page 2-4.

**023**

- Turn the machine off.
- Disconnect the carrier cable from the motor control or system board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

**Does the machine still have the same symptom?**

**Yes No**

**024**

Go to "MAP 0100: Start" on page 2-4.

**025**

- Turn the machine off.
- Carefully disconnect and connect the carrier cable to the motor control or system board two or three times.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

**026**

Replace the carrier cable and go to "MAP 0100: Start" on page 2-4.

027

*Single board machines:* The system board is failing.

*Two-board machines:*

- Measure the voltage at the +5V dc test point on the motor control board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

Yes No

028

The motor control board is failing.

029

- Measure the voltage at the +5V dc test point on the function board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

Yes No

030

The 16-pin cable is failing.

– or –

The function board is failing.

031

The 16-pin cable is failing.

– or –

The function board is failing.

– or –

The motor control board is failing.

---

032

(From step 004)

**Does the machine go system busy when you type several lines?**

Yes No

033

Go to "MAP 0100: Start" on page 2-4.

034

The function board is failing.

---

035

(From step 011)

- Turn the machine off.
- Remove the Spell Check module from the function board. Be sure to observe all ESD precautions.
- Turn the machine on.

(Step **035** continues)

035 (continued)

**Do you still have the same symptom?**

**Yes No**

**036**

The Spell Check module(s) are failing.

**037**

Go to Step 015 on page 2-105.

Notes

## MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000

**Note:** Newer machines have a single function board rather than a separate motor control board and function board. On two-board machines, the cables between the motor control board and the function board and the cables between the CRT control board and function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly. If any options are installed, be sure to also check their cables.

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

**Is the machine totally inoperative (CRT remains dark, no motor movement, no beep, no solenoid operation, and no printwheel movement)?**

**Yes No**

**002**

**Does the machine complete POR?**

**Yes No**

**003**

**Are any options installed?**

**Yes No**

**004**

Go to Step 013 on page 2-111.

**005**

Go to Step 033 on page 2-114.

---

**006**

Go to Step 010 on page 2-111.

---

**007**

If you have measured the power supply output voltage in a previous MAP, go to Step 016 on page 2-112. If you have not yet checked the power supply:

***Single board machines:*** Measure the voltage on the power supply plug at the function board between J15-1 (gnd) and J15-2 (+5 V dc).

***Two-board machines:*** Measure the voltage on the power supply plug at the motor control board between J5-1 (gnd) and J5-2 (+5 V dc).

**Is the voltage between 4.75 V dc and 5.25 V dc**

**Yes No**

**008**

Go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

**009**

(Step **009** continues)

**009** (continued)
Go to Step 016 on page 2-112.

---

**010**

(From step 006)

| Symptom | Action |
|---|---|
| POR complete:<br>• Random characters appear on screen.<br>• Random failures occur. | The function board is failing.<br>or<br>The CRT control board is failing. |
| Screen goes dark after POR. | Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20 |
| POR complete:<br>• Machine goes system busy, screen shows what was last displayed.<br>• The beeper beeps continuously for 4-5 seconds after CRTN is pressed.<br>• The machine goes system busy after a few characters or lines are typed.<br>• The machine goes system busy after pressing the type/screen keybutton.<br>• The screen goes all white after the type/screen keybutton, is pressed. The machine goes system busy. | The function board is failing. |

**Did you find your identical symptom?**

**Yes No**

**011**

Go to Step 016 on page 2-112.

**012**

Perform the action required

---

**013**

(From step 004)

— Check the following chart for your identical symptom(s):

| Symptom | Action |
|---|---|
| POR Incomplete:<br>• WW70, 7000 - Part of IBM logo is on the screen.<br>• WW70, 7000 - The copyright screen turns all white and the machine completes the rest of POR. If the type/screen keybutton is pressed, the screen will go all white. | The function board is failing. |

| Symptom | Action |
|---|---|
| POR Incomplete:<br>• WW70, 7000 – Screen message is "Insert wheel and press CRTN key." The machine goes system busy when the key is pressed.<br>• Screen mostly dark with snow running through it.<br>• The screen has vertical bars rolling horizontally.<br>• WW70, 7000 - IBM logo screen is distorted with a line running thru it.<br>• Screen is dark, beeper beeps continuously. | Replace these FRUs in the following order:<br>1. 22-pin cables between the CRT board and function board.<br>2. Function board<br>3. CRT control board. |

**Did you find your exact symptom?**

**Yes No**

**014**

Go to Step 016.

**015**

Perform the action required

---

**016**

(From steps 007, 011, 014, and 038)

***Single board machines:*** Go to Step 024 on page 2-113.

***Two-board machines:***

– Turn the machine off.

– Remove the 16-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

**Yes No**

**017**

Replace the cable.

**018**

– Install the cable.

– Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

**Yes No**

**019**

Replace the 16-pin cable and go to "MAP 0100: Start" on page 2-4.

**020**

– Remove the 22-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

(Step **020** continues)

020 (continued)

**Is the cable good?**

**Yes No**

021

Replace the cable.

022

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

**Yes No**

023

Replace the 22-pin cable and go to "MAP 0100: Start" on page 2-4.

024

- Turn the machine off.
- Disconnect the carrier cable from the motor control board or the function board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

**Does the machine still have the same symptom?**

**Yes No**

025

Go to "MAP 0100: Start" on page 2-4.

026

- Turn the machine off.
- Carefully disconnect and connect the carrier cable to the motor control board or the function board.
- Turn the machine on.

**Does the machine have the same symptom?**

**Yes No**

027

Replace the carrier cable and go to "MAP 0100: Start" on page 2-4.

028

***Single board machines:*** The system board is failing or the power supply is failing.

***Two-board machines:***

- Measure the voltage at the +5V dc test point on the motor control board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

**Yes No**

029

The motor control board is failing.

**030**

– Measure the voltage at the +5V dc test point on the function board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

Yes No

**031**

The 16-pin cable is failing.

– or –

The function board is failing.

**032**

The 16-pin cable is failing.

– or –

The function board is failing.

– or –

The motor control board is failing.

– or –

The power supply is failing.

---

**033**

(From step 005)

– Check the following chart for your identical symptom:

| **Symptom** | **Action** |
|---|---|
| POR Incomplete (with printer option installed):<br>• Long pause, then the machine attempts to POR again. This will continue until you turn the machine off. | Replace these FRUs in the following order:<br>1. 22-pin cables between the CRT board and function board<br>2. Printer option board<br>3. Function board. |
| POR Incomplete (with diskette option installed):<br>• WW70, 7000 only. Carrier moves to the left frame, Logo screen remains on.<br>• Six long beeps, machine is inoperative except for beeps. | Replace these FRUs in the following order:<br>1. 22-pin cables between the CRT board and function board<br>2. Diskette control board<br>3. Function board.<br>4. Printer option board (if installed) |

**Did you find your identical symptom?**

Yes No

**034**

Go to Step 036 on page 2-115.

**035**

(Step 035 continues)

**035** (continued)
Perform the action required

---

**036**

(From step 034)
- Turn the machine off.
- Disconnect the cables from J13 and J14 on the function board.
- Turn the machine on.

**Do you still have the same symptom?**
**Yes No**

**037**

Go to Step 039.

**038**

Go to Step 016 on page 2-112.

---

**039**

(From step 037)
**Are both the diskette and printer option installed?**
**Yes No**

**040**

**Is the diskette option installed?**
**Yes No**

**041**

The printer option board is failing.

**042**

The diskette option board is failing.

---

**043**

- Turn the machine off.
- Connect the cables to J13 and J14.
- Disconnect the diskette control board from the printer option board.
- Turn the machine on.

**Do you still have the same symptom?**
**Yes No**

**044**

The diskette control board is failing.

**045**

The printer option board is failing.

---

## MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000

**Note:** This MAP is for the Wheelwriter 10, 15, 1500 and 3000. If your machine is a Wheelwriter 30, 35, or 3500, go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120. If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

**001**

- Turn the machine off.
- Turn the machine on.

**Is the machine totally inoperative (no LEDs light, no motor movement, no beep, and no solenoid operation)?**

**Yes No**

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

- Newer machines with fuseless power supply: go to Step 007.
- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

**004**

Go to "MAP 0430: Primary Fuse, Wheelwriter 10, 15" on page 2-170.

**005**

- Install the primary fuse.

***WHEELWRITER 10 typewriter Level 2 and WHEELWRITER 15, 1500, 3000 typewriter:***

- Go to Step 007.

***WHEELWRITER 10 typewriter Level 1:***

- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

**006**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**007**

***WHEELWRITER 10 typewriter Level 1:***

- Put the fuse back in the power supply.

***All machines:***

- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

(Step **007** continues)

007 (continued)

**Is the voltage correct?**

Yes No

008

- Inform the customer there is a problem with the outlet.

009

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

**Is the voltage correct?**

Yes No

010

The line cord is failing.

011

- Check the continuity of the On/Off switch.

**Is there continuity?**

Yes No

012

The On/Off switch is failing.

013

- Install the power cord.
- Turn the machine on.
- Measure the voltage on the power supply plug at the system board or motor control board between pin 1 (GND) and pin 2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes No

014

Go to Step 016.

015

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

---

016

(From step 014)

- Turn the machine off.
- Disconnect the power supply plug from the system board or motor control board.
- Turn the machine on.
- Measure the voltage on the power supply plug between pin 1 (GND) and pin 2 (+5V dc).

(Step **016** continues)

016 (continued)

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes No

017

**Is there a printer option board installed in the machine?**

Yes No

018

Go to "MAP 0420: Power Supply" on page 2-166.

019

Go to Step 021.

020

***Single board machines:***

The system board is failing.

***Two-board machines:***

Go to Step 027 on page 2-119.

021

(From step 019)

- Turn the machine off.
- Disconnect the power supply connector (J6) from the printer option board.
- Turn the machine on.
- Measure the voltage on the power supply connector at the system board or motor control board. Measure between pin 1 (GND) and pin 2 (+5V).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes No

022

Go to Step 024.

023

The printer option board is failing.

024

(From step 022)

- Disconnect the printer option cable from J2 on the power supply.
- Check the continuity on the plug between J6-1 and J6-3.

**Is there continuity?**

Yes No

025

Go to "MAP 0420: Power Supply" on page 2-166.

026

(Step 026 continues)

**026** (continued)
The printer option cable is failing.

---

**027**

(From step 020)
- Turn the machine off.
- Disconnect the 16-Pin and 22-Pin cables between the function board and the motor control board.
- Connect the power supply to J5 on the motor control board.
- Turn the machine on.
- Measure the voltage on the power supply plug J5 between J5-1 and J5-2.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**028**

The motor control board is failing.

**029**

The function board is failing.

## MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500

001

- Turn the machine off.
- Turn the machine on.

**Is the machine totally inoperative (display off, no motor movement, no beep, and no print hammer solenoid operation)?**

**Yes No**

002

Go to "MAP 0100: Start" on page 2-4.

003

***Wheelwriter 30, 35, and 3500 with fuseless power supply:*** Go toStep 007

- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

004

Go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172.

005

- Install the primary fuse.
- If there is no fuse on the power supply board, go to Step 007.
- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

006

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

007

- Put the fuse back in the power supply if any were removed.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

**Is the voltage correct?**

**Yes No**

008

- Inform the customer there is a problem with the outlet.

009

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

(Step 009 continues)

009 (continued)

**Is the voltage correct?**

**Yes No**

**010**

The line cord is failing.

**011**

- Check the continuity of the On/Off switch.

**Is there continuity?**

**Yes No**

**012**

The On/Off switch is failing.

**013**

- Install the power cord.
- Turn the machine on.

***WW30:***

- Measure the voltage on the power supply plug at the motor control board between J5-1 (GND) and J5-2 (+5V dc).

***WW35, 3500:***

- Measure the voltage on the power supply plug at the function board between J15-1 (GND) and J15-2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**014**

Go to Step 016.

**015**

Go to "MAP 0280: Machine Electronics, Wheelwriter 30, 35, 3500" on page 2-104.

---

**016**

(From step 014)

- Turn the machine off.
- Disconnect the power supply plug from the motor control or function board.
- Turn the machine on.
- Measure the voltage on the power supply plug. Measure between Pin1 (GND) and Pin2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**017**

**Is there a printer option board installed in the machine?**

**Yes No**

**018**

(Step **018** continues)

**018** (continued)
Go to Step 030 on page 2-123.

**019**

Go to Step 021.

**020**

*WW30:* Go to Step 027.
— or —
*WW35, 3500:* The system board is failing.

**021**

(From step 019)
- Turn the machine off.
- Disconnect the power supply connector (J6) from the printer option board.
- Turn the machine on.
- Measure the voltage on the power supply connector at the motor control or system board. Measure between Pin1 (GND) and Pin2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**022**

Go to Step 024.

**023**

The printer option board is failing.

**024**

(From step 022)
- Disconnect the printer option cable from J2 on the power supply.
- Check the continuity on the cable plug between J6-1 and J6-3.

**Is there continuity?**

**Yes No**

**025**

Go to "MAP 0420: Power Supply" on page 2-166.

**026**

The cable is failing.

**027**

(From step 020)
- Turn the machine off.
- Disconnect the 16-pin and 22-pin cables between the function board and the motor control board.
- Connect the power supply to J5 on the motor control board.
- Turn the machine on.

(Step **027** continues)

**027** (continued)
- Measure the voltage on the power supply plug J5 between J5-1 and J5-2.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**028**

The motor control board is failing.

**029**

The function board is failing.

---

**030**

(From step 018)

**Is a diskette option installed?**

**Yes No**

**031**

Go to "MAP 0420: Power Supply" on page 2-166.

**032**

- Turn the machine off.
- Disconnect the power supply cable from the diskette control board.
- Disconnect the diskette control board from the function board or printer option board if one is installed.
- Turn the machine on.

**Do you still have the same symptom?**

**Yes No**

**033**

Go to Step 037

**034**

- Disconnect the power supply cable at J2 on the power supply.
- Check the continuity on the plug between J2-1 and J2-3.

**Is there continuity?**

**Yes No**

**035**

Go to "MAP 0420: Power Supply" on page 2-166.

**036**

The cable is failing.

---

**037**

(From step 033)
- Turn the machine off.
- Connect the power supply cable to J2 on the power supply and to the diskette control board.

(Step **037** continues)

037 (continued)

- Connect the Diskette control board to the function board or printer option board (if installed).
- Disconnect the disk drive cable from the diskette control board.

**Do you still have the same symptom?**

Yes No

038

The disk drive or cable is failing.

039

The diskette control board is failing.

Notes

## MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000

**001**

- Turn the machine off.
- Turn the machine on.

**Is the machine totally inoperative (CRT dark, no motor movement, no beep, and no print hammer solenoid operation)?**

**Yes No**

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

***Newer machines with fuseless power supply:*** Go to Step 007

- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

**004**

Go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**005**

- Install the primary fuse.
- If there is no fuse on the power supply board, go to Step 007.
- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

**Is there continuity?**

**Yes No**

**006**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**007**

- Put the fuse back in the power supply if any were removed.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

**Is the voltage correct?**

**Yes No**

**008**

- Inform the customer there is a problem with the outlet.

**009**

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

(Step 009 continues)

009 (continued)

**Is the voltage correct?**

**Yes No**

**010**

The line cord is failing.

**011**

- Check the continuity of the On/Off switch.

**Is there continuity?**

**Yes No**

**012**

The On/Off switch is failing.

**013**

- Install the power cord.
- Turn the machine on.

***Single board machines:*** Measure the voltage on the power supply plug at the function board between J15-1 (GND) and J15-2 (+5V dc).

***Two-board machines:*** Measure the voltage on the power supply plug at the motor control board between J5-1 (GND) and J5-2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**014**

Go to Step 016.

**015**

Go to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

---

**016**

(From step 014)

- Turn the machine off.
- Disconnect the power supply plug from the motor control or function board.
- Turn the machine on.
- Measure the voltage on the power supply plug. Measure between Pin1 (GND) and Pin2 (+5 VDC).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**017**

- Turn the machine off.
- Disconnect the options power supply cable from the power supply
- Turn the machine on.

(Step **017** continues)

017 (continued)

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**018**

The power supply is failing.

**019**

***Single board machines:*** Go to Step 025.

***Two-board machines:*** Go to Step 023.

---

**020**

- Turn the machine off.
- Connect the power supply plug .
- Disconnect the End of Ribbon/Out of paper assembly from the carrier cable board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**021**

Go to Step 025.

**022**

The sensor assembly is failing.

---

**023**

(From step 019)

- Turn the machine off.
- Disconnect the 16-pin and 22-pin cables between the function board and the motor control board.
- Connect the power supply to J5 on the motor control board.
- Turn the machine on.
- Measure the voltage on the power supply plug between J5-1 and J5-2.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**024**

The Motor control board is failing

**025**

(From steps 019 and 021)

- Turn the machine off.
- Disconnect the options power supply cable from the CRT control board and any option boards installed.
- Check for continuity between Pin 1 and Pin 3 on the cable.

(Step **025** continues)

**025** (continued)

**Is there continuity?**

**Yes No**

026

Go to Step 028.

027

The cable is failing.

---

028

(From step 026)

- Connect the options power supply cable to the power supply.
- Connect the options power supply cable to the CRT control board
- Disconnect the CRT control board from the function board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

029

The CRT control board is failing.

030

**Are both the printer and diskette options installed?**

**Yes No**

031

**Is the printer option installed?**

**Yes No**

032

Go to "MAP 0100: Start" on page 2-4.

033

Go to Step 034.

---

034

(From step 033)

- Turn the machine off.
- Connect the options power supply cable to the printer options board.
- Disconnect the printer options board from the function board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

(Step **034** continues)

034 (continued)

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**035**

The printer option is failing.

**036**

- Turn the machine off.
- Connect the options power supply cable to the diskette control board.
- Disconnect the diskette control board from the printer control board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes No**

**037**

The diskette control board is failing.

— or —

The disk drive assembly is failing.

**038**

No trouble found. Go to "MAP 0100: Start" on page 2-4.

Notes

## MAP 0330: Memory Expansion, Wheelwriter 30

**Note:** *If you disconnect the batteries from the function board, all data stored in the machine will be lost. If you need to remove the memory expansion module from the function board, you must disconnect the batteries. Discuss the problem with the customer before you disconnect the batteries.*

**001**

**Does the 30k base machine memory operate correctly?**

**Yes No**

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

- Turn the machine off.
- Check the 32k Memory Module (U302), to make sure it is correctly installed in its socket.

**Are any pins bent, out of the socket, or misaligned?**

**Yes No**

**004**

**Is the module installed in the right direction?**

**Yes No**

**005**

Go to Step 007.

**006**

The 32k memory expansion module is failing.

— or —

The function board is failing.

---

**007**

(From step 005)

- Inform the customer you must disconnect the batteries which will destroy all stored memory.
- Turn the machine off.
- Observe all ESD precautions.
- Disconnect the batteries.
- Correctly install the module.
- Turn the machine on.
- Connect the batteries.
- Put a piece of paper in the machine.
- Select MENU
- Select LIST
- Press crtn

**Does the number that prints on the paper indicate the available memory is greater than 32000 but less than 64000?**

**Yes No**

**008**

(Step 008 continues)

**008** (continued)
The 32k memory expansion module is failing
– or –
The function board is failing

**009**

No trouble found.

## MAP 0340: Options Inoperative

**001**

**Did you come here from "MAP 0170: Error Codes" on page 2-48?**

Yes No

**002**

Go to Step 006.

**003**

- Turn the machine off.
- Turn the machine on.

**WW10, 15, 1500, 3000 - Does the machine display error code of flashing line space LEDs 1 and 1.5?**

**WW30, 35, 50, 70, 5000, 7000 - Does the machine display error code 102?**

Yes No

**004**

Go to Step 006.

**005**

There is a mismatch between the microcode on the printer option board and the code on the function board.

Verify what level code you should be using.

---

**006**

(From steps 002 and 004)

**Is the printer option installed on your machine?**

Yes No

**007**

Go to Step 010.

**008**

**Does the printer option operate correctly?**

Yes No

**009**

Go to "MAP 0480: Printer Option" on page 2-186.

**010**

(From step 007)

**Is the pinwheel form feeder option installed on your machine?**

Yes No

**011**

Go to Step 024 on page 2-135.

**012**

**Does the out-of-paper sensor operate correctly?**

**Yes No**

**013**

Go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138.

**014**

**Does the end-of-ribbon sensor operate correctly?**

**Yes No**

**015**

Go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36.

**016**

**Does the pinwheel form feeder option operate correctly?**

**Yes No**

**017**

Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

**018**

**Does the sheetfeed option operate correctly?**

**Yes No**

**019**

Go to "MAP 0540: Sheetfeed" on page 2-204.

**020**

**Does your machine have a spell check option?**

**Yes No**

**021**

Go to Step 024.

**022**

**Does the spell check option operate correctly?**

**Yes No**

**023**

Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

**024**

(From steps 011 and 021)
(Step **024** continues)

**024** (continued)

**Is a diskette option installed?**

**Yes No**

**025**

Go to "MAP 0100: Start" on page 2-4.

**026**

**Does the diskette option operate correctly?**

**Yes No**

**027**

Go to "MAP 0130: Diskette Option" on page 2-24.

**028**

Go to "MAP 0100: Start" on page 2-4.

Notes

## MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000

**Note:** *This MAP is for the Wheelwriter 10, 15, 1500, and 3000 only. If your machine is a Wheelwriter 30, 35, 50, 70, 3500, 5000, or 7000 go to "MAP 0360: Out-of-Paper Sensor—Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-142.*

**001**

**Is a printer option board installed on your machine?**

**Yes No**

**002**

Inform the customer the out-of-paper sensor is intended to work only with this option.

**003**

**Is a form feeder or sheetfeed installed on your machine?**

**Yes No**

**004**

Inform the customer the out-of-paper sensor is intended to work only with either one of these options installed.

**005**

- Remove the ribbon cartridge from the machine.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

**Is the CONT LED off?**

**Yes No**

**006**

Go to Step 011 on page 2-139.

**007**

- Insert a piece of paper into the machine and move the platen up and down so the edge of the paper passes between the sensor and the platen.

**Does the CONT LED go on and off?**

**Yes No**

**008**

Go to "MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000" on page 2-146.

**009**

- Check the sensor assembly adjustments.

**Are the adjustments correct?**

**Yes No**

**010**

Make the adjustments and go to "MAP 0100: Start" on page 2-4.

**011**

(From step 006)

- Check the platen for paper dust and excessive ink.

**Is the platen clean?**

**Yes No**

**012**

Clean the platen.

**013**

- Move the carrier to the right side frame.
- Activate the switch and sensor test.

**Is the CONT LED off?**

**Yes No**

**014**

Go to "MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000" on page 2-146.

**015**

- Clean the platen.
- Move the carrier to the center of the machine.
- Activate the switch and sensor test.

**Is the CONT LED off?**

**Yes No**

**016**

- Check for a bright light shining directly on the typewriter such as sunlight, overhead light, or desk light.

**Is there a bright light shining on the typewriter?**

**Yes No**

**017**

The sensor assembly is failing.

**018**

Block the light from shining on the end-of-paper sensor.

**Is the CONT LED off?**

**Yes No**

**019**

Go to "MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000" on page 2-146.

**020**

Inform the customer that the bright light is causing the machine to malfunction.

**021**

**Is a pinwheel forms feeder installed on your machine?**

Yes No

**022**

Go to Step 029.

**023**

- Make sure the switch and sensor test is still activated.

**Is the line space 3 LED on?**

Yes No

**024**

**Is the form feeder assembly firmly latched down?**

Yes No

**025**

Correctly install the form feeder.

**026**

**Is the sensor switch cable correctly connected to the printer option board?**

Yes No

**027**

Correctly connect the cable to the printer option board.

**028**

Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

**029**

(From step 022)

- Make sure the switch and sensor test is still activated.

**Is the line space 2 LED on?**

Yes No

**030**

**Is the sheetfeed assembly firmly latched down?**

Yes No

**031**

Correctly install the sheetfeed.

**032**

Go to "MAP 0540: Sheetfeed" on page 2-204.

**033**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0360: Out-of-Paper Sensor—Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

**001**

**Is a pinwheel form feeder or sheetfeed installed on your machine?**

Yes No

**002**

Inform the customer the out-of-paper sensor is intended to work only with one of these options installed.

**003**

- Remove the ribbon cartridge from the machine.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

**Is the CONT indicator off?**

Yes No

**004**

Go to Step 009.

**005**

- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

**Does CONT turn on and off?**

Yes No

**006**

Go to "MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-152.

**007**

**Is the sensor switch assembly installed correctly?**

Yes No

**008**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

**009**

(From step 004)

- Check the platen for paper dust and excessive ink.

**Is the platen clean?**

Yes No

**010**

Clean the platen.

**011**

(Step **011** continues)

**011** (continued)
- Move the carrier to the right side frame.
- Activate the switch and sensor test.

**Is CONT off?**

**Yes No**

**012**

Go to "MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-152.

**013**

- Clean the platen.
- Move the carrier to the center of the machine.
- Activate the switch and sensor test.

**Is the CONT indicator off?**

**Yes No**

**014**

- Check for a bright light shining directly on the typewriter such as sunlight, overhead light, or desk light.

**Is there a bright light shining on the typewriter?**

**Yes No**

**015**

Go to "MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-152.

**016**

Block the light from shining on the end-of-paper sensor.

**Does CONT turn off?**

**Yes No**

**017**

Go to "MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-152.

**018**

Inform the customer that the bright light is causing the machine to malfunction.

**019**

**Is a pinwheel forms feeder installed on your machine?**

**Yes No**

**020**

Go to Step 028 on page 2-144.

**021**

(Step **021** continues)

**021** (continued)

— Make sure the switch and sensor test is still activated.

- SUSPND appears on the display when the sensor switch cable is connected to printer option board.
- TADJ appears on the display when the sensor switch cable is connected to function board.

**Does SUSPND or TADJ appear on the display?**

Yes No

**022**

**Is the form feeder assembly firmly latched down?**

Yes No

**023**

Correctly install the form feeder.

**024**

**Is the sensor switch cable correctly connected?**

Yes No

**025**

Connect the cable correctly.

**026**

Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

— or —

Go to "MAP 0540: Sheetfeed" on page 2-204.

**027**

Go to "MAP 0100: Start" on page 2-4.

**028**

(From step 020)

— Make sure the switch and sensor test is still activated.

- CENTER appears on the display when the sensor switch cable is connected to printer option board.
- PLAY appears on the display when the sensor switch cable is connected to function board.

**Does CENTER or PLAY appear on the display?**

Yes No

**029**

**Is the sheetfeed assembly properly latched down?**

Yes No

**030**

Correctly install the form feeder.

**031**

(Step 031 continues)

**031** (continued)
Go to "MAP 0540: Sheetfeed" on page 2-204.

**032**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000

**001**

- Check the out-of-paper sensor for paper dust, ribbon particles or obstruction.

**Is the paper sensor clean?**

Yes No

**002**

Clean the sensor and go to "MAP 0100: Start" on page 2-4.

**003**

- Turn the machine off.
- Turn the machine on.
- Remove any paper from the machine.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

**Is the CONT LED off?**

Yes No

**004**

Go to Step 012 on page 2-147.

**005**

- Make sure the switch and sensor test is still activated.
- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

**Does the CONT LED go on and off?**

Yes No

**006**

Go to Step 012 on page 2-147.

**007**

- Try the machine several times.

**Does the machine still have the same symptom?**

Yes No

**008**

Go to "MAP 0100: Start" on page 2-4.

**009**

**Is the sensor switch assembly installed correctly?**

Yes No

**010**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

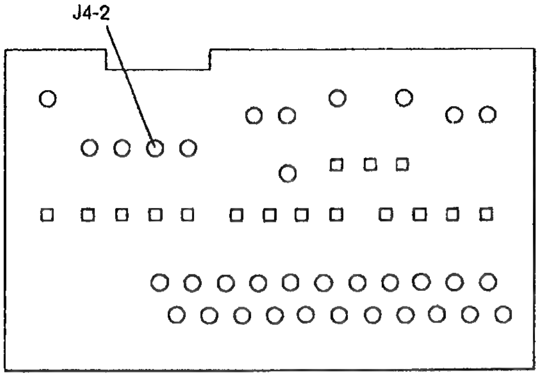
**011**

Go to "MAP 0100: Start" on page 2-4.

**012**

(From steps 004 and 006)

- With the paper between the sensor and the platen, measure the voltage at J4-2 on the carrier cable board.



**Is it approximately 0 V dc?**

**Yes No**

**013**

Go to Step 015.

**014**

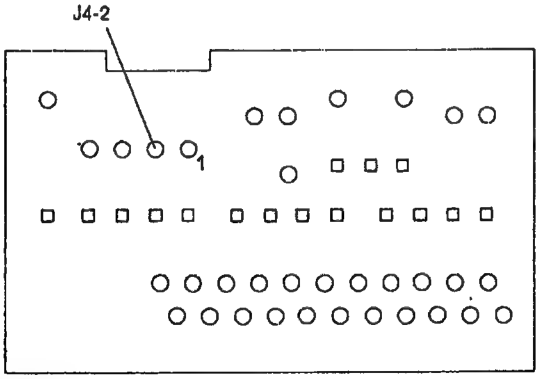
Go to Step 031 on page 2-149.

---

**015**

(From step 013)

- Monitor the voltage at J4-2 on the carrier cable board as you slowly pass a piece of paper between the out-of-paper sensor and the platen.



**Does the voltage change?**

**Yes No**

**016**

Go to Step 018 on page 2-148.

**017**

Go to Step 023.

---

**018**

(From step 016)

- Measure the voltage between J4-4 (gnd) and J4-1 (+5 V dc) on the carrier cable board.

**Is the voltage between +4.5 V dc and +5.5 V dc?**

**Yes No**

**019**

Remove the carrier cable. Check the continuity of lines 6, 7, and 19.

**Is there continuity?**

**Yes No**

**020**

The carrier cable is failing.

**021**

***Single board machines:*** The function board is failing.

***Two-board machines:*** The motor control board is failing.

---

**022**

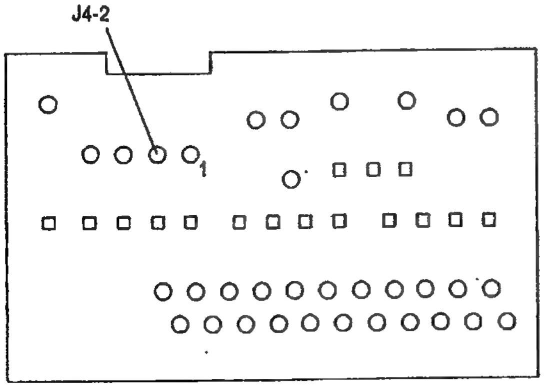
The out-of-paper sensor assembly is failing.

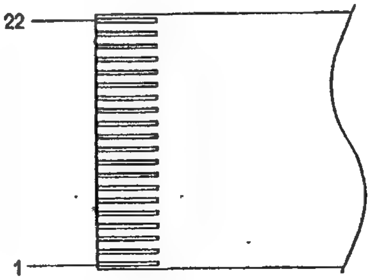
---

**023**

(From step 017)

- Disconnect the carrier cable from the system board or motor control board.
- Check the continuity from line 19 on the end of the carrier cable to J4-2 on the carrier cable board.





CARRIER CABLE

**Is there continuity?**

**Yes No**

**024**

(Step 024 continues)

**024** (continued)
Go to Step 028.

**025**

***Single board machines:*** The function board is failing.

***Two-board machines:***

— Check the continuity of the 16-Pin cable between the function board and the motor control board.

**Is there continuity?**

**Yes No**

**026**

The 16-Pin cable is failing.

**027**

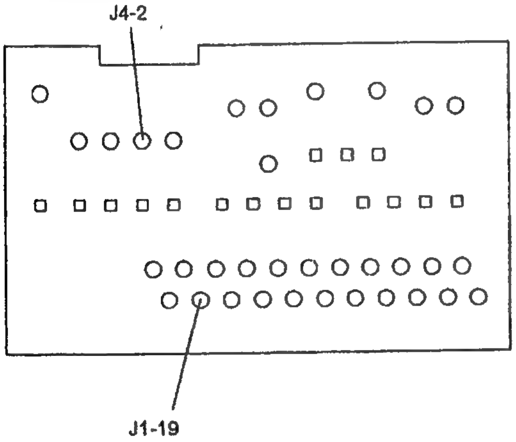
The motor control board is failing.

---

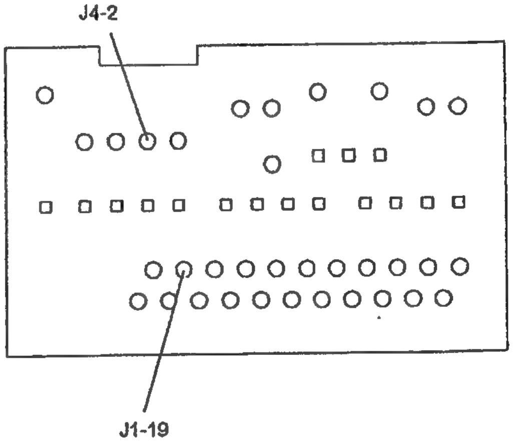
**028**

(From step 024)

— Check the continuity of the carrier cable board between J1-19 and J4-2.



Level 1



Level 2

**Is there continuity?**

**Yes No**

**029**

The carrier cable board is failing.

**030**

The carrier cable is failing.

---

**031**

(From step 014)

— Turn the machine off.

(Step **031** continues)

**031** (continued)

- Disconnect J4 at the carrier cable board.
- Turn the machine on.
- Measure the voltage at J4-2 on the carrier cable board.

**Is it approximately 0 V dc?**

**Yes No**

**032**

The sensor assembly is failing.

**033**

Go to Step 023 on page 2-148.

## Notes

## MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

**001**

- Check the out-of-paper sensor for paper dust, ribbon particles or obstruction.

**Is the paper sensor clean?**

Yes No

**002**

Clean the sensor and go to "MAP 0100: Start" on page 2-4.

**003**

- Turn the machine off.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

**Is the CONT indicator off?**

Yes No

**004**

Go to Step 014 on page 2-153.

**005**

- Make sure the switch and sensor test is still activated.
- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

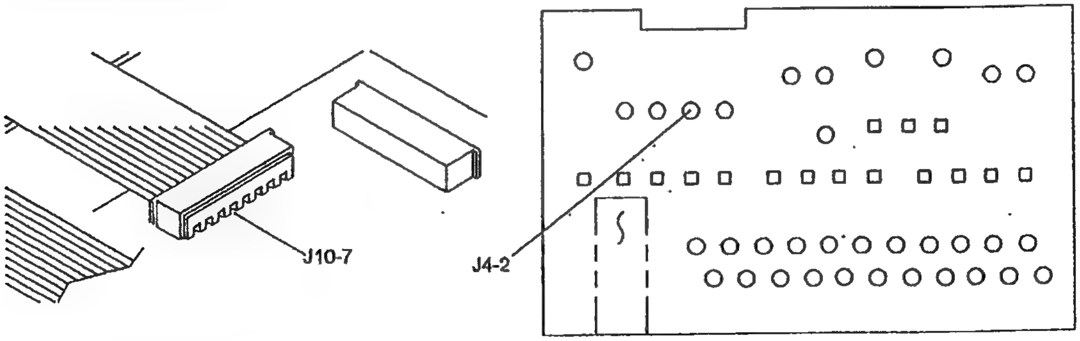
**Does CONT turn on and off?**

Yes No

**006**

***Single board machines:*** With the paper between the sensor and the platen, measure the voltage at the PAPSEN test point on the function board.

***Two-board machines:*** With the paper between the sensor and the platen, measure the voltage at J10-7 on the function board.



**Is it approximately 0 V dc?**

Yes No

**007**

(Step 007 continues)

**007** (continued)
Go to Step 014.

**008**

Go to Step 025 on page 2-155.

**009**

— Try the machine several times.

**Does the machine still have the same symptom?**

**Yes No**

**010**

Go to "MAP 0100: Start" on page 2-4.

**011**

**Is the sensor switch assembly installed correctly?**

**Yes No**

**012**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

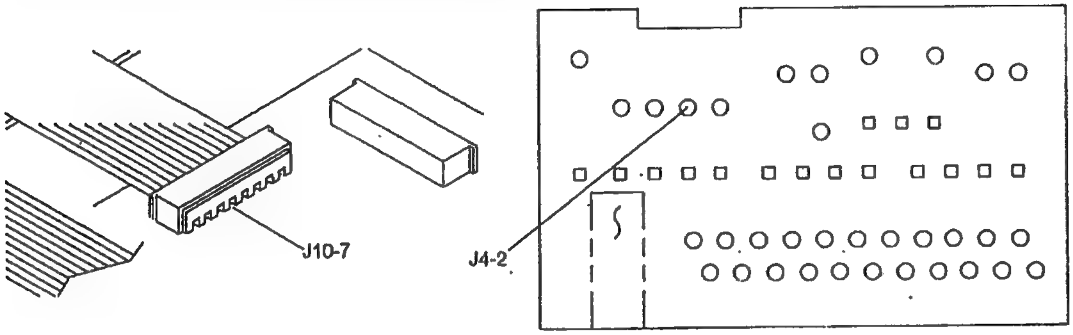
**013**

Go to "MAP 0100: Start" on page 2-4.

---

**014**

(From steps 004 and 007)
***Single board machines:*** Monitor the voltage on the PAPSEN test point on the function board as you slowly pass a piece of paper between the out-of-paper sensor and the platen.
***Two-board machines:*** Monitor the voltage at J10-7 on the function board as you slowly pass a piece of paper between the out-of- paper sensor and the platen.



**Does the voltage change?**

**Yes No**

**015**

Go to Step 017 on page 2-154.

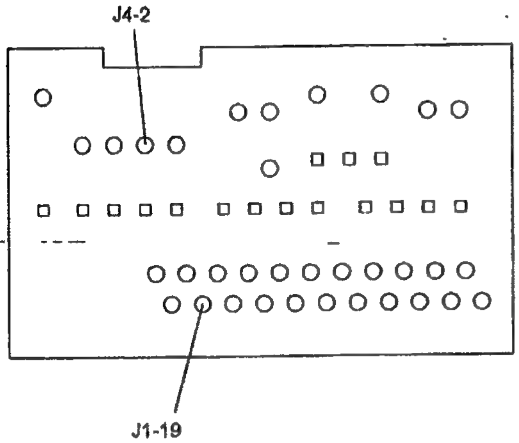
**016**

(Step **016** continues)

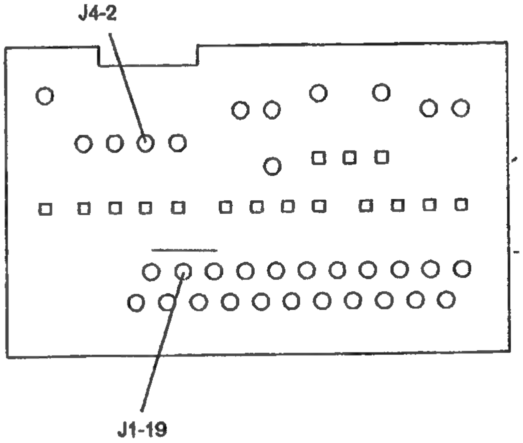
**016** (continued)
The 16-Pin Cable between the function board and the motor control board is failing.
— or —
The function board is failing.
— or —
The motor control board is failing.

**017**

(From step 015)
- Turn the machine off
- ***Single board machines:*** Check the continuity between the PAPSEN test point on the function board and J4-2 on the carrier cable board.



Level 1



Level 2

- ***Two-board machines:*** Check the continuity between J10-7 on the function board and J4-2 on the carrier cable board.

**Is there continuity?**
**Yes No**

**018**

- Disconnect the carrier cable from the motor control board or the function board.
- Check the continuity of line 19 from the end of the carrier cable to J4-2 on the carrier cable board.

**Is there continuity?**
**Yes No**

**019**

Go to Step 022 on page 2-155.

**020**

***Single board machines:*** The function board is failing.
***Two-board machines:***
The 16-pin cable between the function board and the motor control board is failing.
— or —
The motor control board is failing.

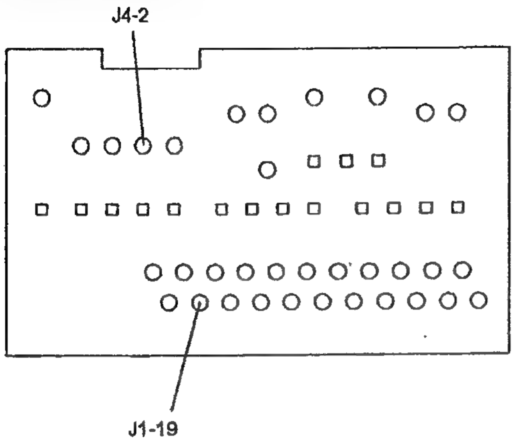
**021**

The sensor assembly is failing.

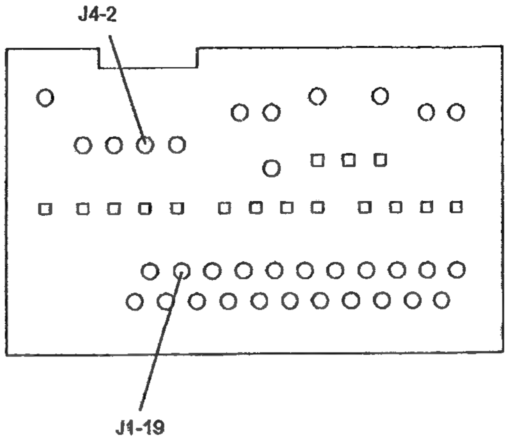
---

**022**

(From step 019)
- Check the continuity of the carrier cable board between J1-19 and J4-2.



Level 1



Level 2

**Is there continuity?**
**Yes No**

**023**

The carrier cable board is failing.

**024**

The carrier cable is failing.

---

**025**

(From step 008)
- Turn the machine off.
- Disconnect J4 at the carrier cable board.
- Turn the machine on.
- ***Single board machines:*** Measure the voltage at the PAPSEN test point on the function board.
- ***Two-board machines:*** Measure the voltage at J10-7 on the function board.

**Is it approximately 0 V dc?**
**Yes No**

**026**

The sensor assembly is failing.

**027**

The function board is failing.
— or —
The motor control board is failing.

## MAP 0390: Paperfeed

**001**

This chart lists the FRUs in the most probable order of failure.

| Symptom | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Paperfeed and/or other keybuttons fail | G | | | | | |
| No paperfeed | F | E | | | | |
| Too little paperfeed, skewing, bent or wrinkled paper | E | D | C | B | F | A |
| Noisy paperfeed | F | D | | | | |
| Too much paperfeed | H | | | | | |

| | FRU | Action |
|---|---|---|
| A | Cardholder | See "Cardholder Adjustment" on page 3-2 |
| B | Paper Release | Cams: Worn, cracked, broken, or loose on shaft |
| C | Paper Bail | Check:<br>• Rubber. Is it dirty, worn, or cracked?<br>• Springs.<br>• Paper Bail arms. Are they worn?<br>• Bail Rollers. Do they bind? |
| D | Feed Rollers and Deflector | Check the rubber. Is it dirty, worn, or cracked?<br>See "Deflector Adjustment" on page 3-3. |
| E | Platen | Check:<br>• Rubber. Is it dirty, worn, or cracked?<br>• Latches.<br>• Gear. Is it worn? |
| F | Paperfeed Motor | If the motor is noisy or does not run, Go to "MAP 0400: Paperfeed Electrical" on page 2-158.<br>Check the gear. Is it loose, broken, or worn? |
| G | Keyboard | Go to "MAP 0260: Keyboard" on page 2-96. |
| H | Motor Control Board or System Board | The motor control board or the function board is failing. |

Notes

## MAP 0400: Paperfeed Electrical

**001**

***Single board machines:*** Go to Step 003.

***Two board machines:***

- Check the 16- and 22-pin cables connecting the motor control board and the function board for alignment, correct fit, rolled edges and damaged corners. The cables may shift out of adjustment when you remove the board cover.

**Are the cables good?**

**Yes No**

**002**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

**003**

(From step 001)

- Turn the machine on.
- Set the line space on 3.
- Mark the platen.
- Operate the carrier return 9 times.

**Does the platen make a complete revolution?**

**Yes No**

**004**

Go to Step 010.

**005**

- Operate the carrier return 9 times.

**Does the platen make a complete revolution without excessive noise?**

**Yes No**

**006**

- Check for binds, loose, broken, or worn parts.

**Are the parts good?**

**Yes No**

**007**

Repair or replace parts as required and go to "MAP 0100: Start" on page 2-4.

**008**

Go to Step 010.

---

**009**

Go to Step 010.

---

**010**

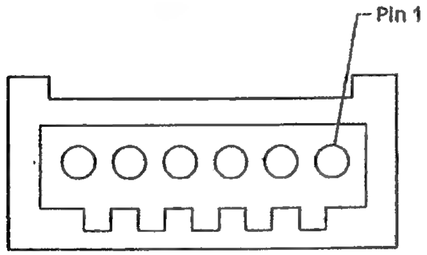
(From steps 004, 008, and 009)

(Step **010** continues)

**010** (continued)

- Turn the machine off.
- Disconnect the paperfeed motor cable from the paperfeed motor.
- Set your meter on **X1**
- Carefully zero the meter.
- Measure the resistance of the paperfeed motor on the motor connector as indicated in the chart below. To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

| Meter Connections | Reading |
|---|---|
| Pin 1 to Pin 3 | 6 - 8 ohms |
| Pin 2 to Pin 4 | 6 - 8 ohms |
| Pin 1 to Pin 5 | 13 - 18 ohms |
| Pin 2 to Pin 6 | 13 - 18 ohms |
| Pin 1 to Pin 2, 4, 6 | Infinity |
| Pin 2 to Pin 1, 3, 5 | Infinity |
| Pin 1 to Motor Housing | Infinity |
| Pin 2 to Motor Housing | Infinity |
| Pin 3 to Motor Housing | Infinity |
| Pin 4 to Motor Housing | Infinity |
| Pin 5 to Motor Housing | Infinity |
| Pin 6 to Motor Housing | Infinity |



MOTOR CONNECTOR

**Are the measurements correct?**

**Yes** **No**

**011**

Go to Step 019 on page 2-160.

**012**

- Check the continuity of the paperfeed motor cable.

**Is there continuity?**

**Yes** **No**

**013**

The paperfeed motor cable is failing.

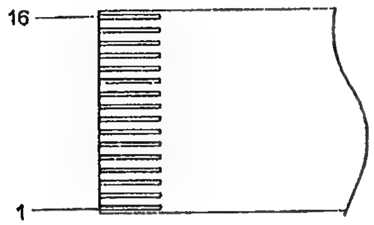
**014**

***Single board machines:*** Go to Step 019 on page 2-160.
(Step **014** continues)

**014** (continued)

***Two board machines:***

- Turn the machine off.
- Disconnect the 16-pin cable at J3 on the motor control board.
- Turn the machine on.
- Measure the voltage on pin 15 of the cable.



CABLE

**Is the voltage between 4.5 V dc and 5.5 V dc?**

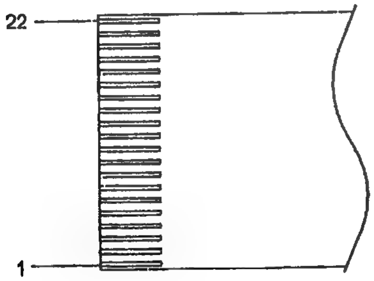
**Yes** **No**

**015**

Go to Step 022 on page 2-161.

**016**

- Turn the machine off.
- Disconnect the 22-pin cable at J1 on the motor control board.
- Turn the machine on.
- Measure the voltage on pins 20 and 22 of the cable.



CABLE

**Is the voltage between 4.5 V dc and 5.5 V dc?**

**Yes** **No**

**017**

Go to Step 022 on page 2-161.

**018**

The motor control board is failing.

---

**019**

(From steps 011 and 014)
(Step **019** continues)

019 (continued)

**Are any motor pins shorted to the motor housing?**

**Yes No**

**020**

The paperfeed motor is failing.

**021**

***Single board machines:*** The system board and the paperfeed motor are failing.
***Two board machines:*** The motor control board and the paperfeed motor are failing.

---

**022**

(From steps 015 and 017)

- Check the cable for continuity.

**Is there continuity?**

**Yes No**

**023**

The cable is failing.

**024**

The function board is failing.

## MAP 0410: Pinwheel Form Feeder

**001**

**Is the deflector-to-frame ground strap installed correctly?**
**Is the platen ground clip installed correctly? The clip must contact the metal shaft of the platen.**

**Yes No**

**002**

Correct as necessary.

**003**

(From step 015)
– Activate the switch and sensor test.

**WW10, 15, 1500, 3000 - Does the Line space 3 LED come on?**
**WW30, 35, 50, 70, 3500, 5000, 7000 -**

- **Does the SUSPND indicator come on (pinfeed connected to the function board)?**
- **Does the TADJ indicator come on (pinfeed connected to the printer option board)?**

**Yes No**

**004**

**Are the platen and form feeder correctly installed?**
**Yes No**

**005**

Install the platen and form feeder correctly.

**006**

Go to Step 008.

---

**007**

Go to Step 020 on page 2-164.

---

**008**

(From step 006)
– Remove the form feeder assembly.
– Ensure the switch and sensor test is activated.
– Manually actuate the left form feeder switch (large actuator). Press the actuator down until you hear a click.

**WW10, 15, 1500, 3000 - Does the Line space 3 LED come on?**
**WW30, 35, 50, 70, 3500, 5000, 7000 -**

- **Does the SUSPND indicator come on (pinfeed connected to the function board)?**
- **Does the TADJ indicator come on (pinfeed connected to the printer option board)?**

**Yes No**

009

- Disconnect the form feeder switch cable from the printer option board or the function board.
- Check for continuity between pins 1 and 2 on the plug as you activate the switch.

**Is there continuity?**

Yes No

010

The form feeder switch assembly is failing.

011

Go to Step 013.

---

012

Go to Step 016 on page 2-164.

---

013

(From step 011)

- Ensure the switch and sensor test is activated.
- WW10, 15, 1500, 3000 with pinfeed connected to the printer option board: Short together J5-1 and and J5-2 on the printer option board.
- WW10, 15, 1500, 3000 with pinfeed connected to the function board: Short together J17-1 and and J17-2 on the printer option board.
- WW30 and two-board WW50: Short together J7-1 and J7-2 on the function board.
- Two-board WW70: Short together J6-1 and J6-2 on the function board.
- WW35, 3500 single board WW50, 5000 and single board WW70, 7000: Short together J17-1 and J17-2 on the function board.

**WW10, 15, 1500, 3000 - Does the Line space 3 LED come on?**
**WW30, 35, 50, 70, 3500, 5000, 7000 -**

- **Does the SUSPND indicator come on (pinfeed connected to the function board)?**
- **Does the TADJ indicator come on (pinfeed connected to the printer option board)?**

Yes No

014

***Wheelwriter 10, 15, 1500, 3000:***
The 22-pin cable between the function board and the motor control board is failing.
The printer option board is failing.
— or —
The function board is failing.

***Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000***
— or —
The 22-pin cable between the function board and the motor control board is failing.
— or —
The function board is failing.

015

Go to Step 003 on page 2-162.

---

**016**

(From step 012)

**Does the form feeder actuate the switch?**

**Yes No**

**017**

— Check the form feeder switch to be sure it is operating correctly.

**Is the switch operating correctly?**

**Yes No**

**018**

Correct the problem.

**019**

The form feeder is failing.

---

**020**

(From step 007)

**Does the form feeder correctly feed paper?**

**Yes No**

**021**

— Press the paper up/down buttons on the typewriter.

**Does the platen turn?**

**Yes No**

**022**

Go to "MAP 0100: Start" on page 2-4.

**023**

Go to Step 025.

---

**024**

Go to Step 035 on page 2-165.

---

**025**

(From step 023)

**Does the form feeder turn?**

**Yes No**

**026**

(Step **026** continues)

026 (continued)

**Does the gear on the platen mesh with the gear on the form feeder?**

**Yes No**

**027**

Repair as necessary.

**028**

Go to Step 032.

---

**029**

**Are there any obstructions in the form feeder?**

**Yes No**

**030**

The form feeder is failing.

**031**

Remove the obstruction.

---

**032**

(From step 028)

**Is either the gear on the platen or the gear on the form feeder loose?**

**Yes No**

**033**

The form feeder is failing.

**034**

Tighten the appropriate gear.

---

**035**

(From step 024)

**Does the typewriter correctly feed a single sheet of paper?**

**Yes No**

**036**

Go to "MAP 0390: Paperfeed" on page 2-156.

**037**

Go to "MAP 0100: Start" on page 2-4.

---

## MAP 0420: Power Supply

**001**

— Check connector J2 on the power supply for bent or shorted pins.

**Is the connector good?**

Yes No

**002**

Repair as necessary.

**003**

**Note:** There are three levels of power supplies.

1. Level one - the primary fuse is located in an external removable fuse holder. Fuse F1 (+5V) is mounted on the regulator board.
2. Level two - the primary fuse is located inside the switch tower. There is no fuse F1 (+5V).
3. Level three - there are no replaceable fuses. If the power supply has no fuses go to Step 020 on page 2-167

**Have you checked the continuity of the primary and F1 fuses?**

Yes No

**004**

Go to Step 012 on page 2-167.

**005**

**Is the primary fuse good?**

Yes No

**006**

WW 10, 15 - go to "MAP 0430: Primary Fuse, Wheelwriter 10, 15" on page 2-170.
WW30 - go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172.
WW 50, 70 - go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**007**

**Is fuse F1 (+5V) installed on your power supply?**

Yes No

**008**

Go to Step 020 on page 2-167.

**009**

**Is fuse F1 (+5V) good?**

Yes No

**010**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**011**

Go to Step 020.

---

**012**

(From step 004)

**Is the machine totally inoperative (no LEDs light, no motor movement, no beep, and no solenoid operation)?**

Yes No

**013**

Go to "MAP 0100: Start" on page 2-4.

**014**

- Turn the machine off.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

**Is there continuity?**

Yes No

**015**

WW 10, 15 - go to "MAP 0430: Primary Fuse, Wheelwriter 10, 15" on page 2-170.
WW30 - go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172.
WW 50,70 - go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**016**

**Is fuse F1 (+5V) installed on your power supply?**

Yes No

**017**

Go to Step 022 on page 2-168.

**018**

- Install the primary fuse.
- Remove fuse F1 from the power supply board.
- Check the continuity of the fuse.

**Is there continuity?**

Yes No

**019**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**020**

(From steps 008 and 011)

- Put the fuse back into the power supply.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

(Step **020** continues)

**020** (continued)

**Is the voltage correct?**

**Yes No**

**021**

Inform the customer there is a problem with the outlet.

**022**

(From step 017)

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

**Is the voltage correct?**

**Yes No**

**023**

The line cord is failing.

**024**

- Check the continuity of the on/off switch.

**Is there continuity?**

**Yes No**

**025**

The on/off switch is failing.

**026**

The power supply assembly is failing.

Notes

## MAP 0430: Primary Fuse, Wheelwriter 10, 15

**Note:** This MAP is for the Wheelwriter 10 and 15. If your machine is a Wheelwriter 30, go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172. If your machine is a Wheelwriter 50 or 70, go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**001**

- Turn the machine off.
- Be certain the machine is unplugged.
- Replace the primary fuse.
- Plug in the machine.

***Single board machines:***

***WHEELWRITER 10 typewriter: Level 1***

- Disconnect power connector J9 from the system board.
- Turn the machine on.

***WHEELWRITER 10 typewriter: Level 2***

- Disconnect power connector J15 from the system board.
- Turn the machine on.

***WHEELWRITER 15 typewriter:***

- Disconnect J15 from the system board.
- Turn the machine on.

***Two-board machines:***

- Disconnect J5 from the motor control board.
- Turn the machine on.

**Does the primary fuse blow again?**

**Yes No**

**002**

- Turn the machine off.
- Set your meter to the **RX1** scale.

***Single board machines:***

***WHEELWRITER 10 typewriter: Level 1***

- Measure the resistance between J9-7 (GND) and J9-8 ( +32V) on the system board.

***WHEELWRITER 10 typewriter: Level 2***

- Measure the resistance between J15-7 (GND) and J15-8 ( +32V) on the system board.

***WHEELWRITER 15 typewriter:***

- Measure the resistance between J15-7 (GND) and J15-8 ( +32V) on the system board.

***Two-board machines:***

- Measure the resistance between J5-7 (GND) and J5-8 ( +32V) on the motor control board.

**Note:** For all machines: The meter polarity switch must be set to + and the red meter lead (VOM) connected to Pin7 and the black meter lead (COM) connected to Pin8.

**Is the resistance less than 15 ohms?**

**Yes No**

**003**

Go to Step 006 on page 2-171.

**004**

***Single board machines:*** The function board is failing.

***Two-board machines:*** The motor control board is failing.

**005**

The power supply assembly is failing.

---

**006**

(From step 003)
– Set your meter to the **RX100** scale.

***Single board machines***

***WHEELWRITER 10 typewriter:, Level 1***
– Measure the resistance between J9-2 (+5V) and J9-8 (+32V) on the system board.

***WHEELWRITER 10 typewriter:, Level 2***
– Measure the resistance between J15-2 (+5V) and J15-8 (+32V) on the system board.

***WHEELWRITER 15 typewriter:***
– Measure the resistance between J15-2 (+5V) and J15-8 (+32V) on the system board.

***Two-board machines:***
– Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

> **Note:** For all machines: The meter polarity switch must be set to + and the red meter lead (VOM) connected to Pin8 and the black meter lead (COM) connected to Pin2.

**Is the resistance less than 500 ohms?**

Yes No

**007**

– Check each of the following, in the order shown, for pin-to-housing shorts (check between the pins in the motor connector and the motor or solenoid housing):

- Transport Motor
- Ribbon Lift/Feed Motor
- Paperfeed Motor
- Selection Motor
- Print Hammer Solenoid.

**Do any of the motors have a pin-to-housing short?**

Yes No

**008**

Go to "MAP 0100: Start" on page 2-4.

**009**

***Single board machines:***
The motor and the system board are failing.

***Two-board machines:***
The motor and the motor control board are failing.

---

**010**

***Single board machines:***
The system board is failing.

***Two-board machines:***
The motor control board is failing.

## MAP 0440: Primary Fuse, Wheelwriter 30

**001**

- Turn the machine off.
- Replace the primary fuse.
- Disconnect J5 from the motor control board.
- Turn the machine on.

**Does the primary fuse blow again?**

**Yes No**

**002**

- Turn the machine off.
- Set your meter to the **RX1K** scale.
- Measure the resistance between J5-7 (GND) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-7 and the black meter lead (COM) connected to J5-8.

**Is the resistance less than 15 ohms?**

**Yes No**

**003**

Go to Step 019 on page 2-173.

**004**

The motor control board is failing.

---

**005**

**Is the option power supply cable installed on J2 on the power supply?**

**Yes No**

**006**

The power supply assembly is failing.

**007**

- Disconnect the options power supply cable from the power supply.
- Replace the primary fuse.
- Turn the machine on.

**Does the primary fuse blow again?**

**Yes No**

**008**

Go to Step 010.

**009**

The power supply assembly is failing.

---

**010**

(From step 008)
(Step **010** continues)

**010** (continued)

**Are the printer option and diskette options installed?**

**Yes No**

**011**

**Is the printer option installed?**

**Yes No**

**012**

Go to Step 016.

**013**

Go to Step 014.

---

**014**

(From step 013)
- Disconnect the printer option board from the diskette board
- Connect the option power supply cable to the printer option board. (Be sure the cable is installed correctly)
- Turn the machine on.

**Does the primary fuse blow again?**

**Yes No**

**015**

The Printer option board is failing.

**016**

(From step 012)
- Turn the machine off.
- Connect the option power supply cable to the diskette control board.
- (Be sure the cable is installed correctly)
- Turn the machine on.

**Does the primary fuse blow again?**

**Yes No**

**017**

Go to "MAP 0100: Start" on page 2-4.

**018**

The diskette control board is failing.

— or —

The diskette drive is failing.

---

**019**

(From step 003)
- Turn the machine off.
- Set your meter to the **RX10K** scale.

(Step **019** continues)

**019** (continued)

- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

  **Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-8 and the black meter lead (COM) connected to J5-2.

**Is the resistance less than 500 ohms?**

**Yes No**

**020**

- Check each of the following, in the order shown, for pin-to-housing shorts (check between the pins in the motor connector and the motor or solenoid housing):

  - transport motor
  - ribbon lift/feed motor
  - paperfeed motor
  - selection motor
  - print hammer solenoid.

**Do any of the motors have a pin-to-housing short?**

**Yes No**

**021**

The motor control board is failing.

**022**

The motor and the motor control board are failing.

**023**

The motor control board is failing.

Notes

## MAP 0450: Primary Fuse, Wheelwriter 50, 70

**001**

- Turn the machine off.
- Unplug the machine.
- Replace the primary fuse.
- Disconnect J5 from the motor control board.
- Plug the machine in.
- Turn the machine on.

**Does the primary fuse blow?**

**Yes No**

**002**

- Turn the machine off.
- Set your meter to the **RX1K** scale.
- Measure the resistance between J5-7 (GND) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-7 and the black meter lead (COM) connected to J5-8.

**Is the resistance less than 15 ohms?**

**Yes No**

**003**

Go to Step 032 on page 2-179.

**004**

The motor control board is failing.

---

**005**

- Turn the machine off.
- Unplug the machine.
- Replace the primary fuse.
- Disconnect the options power supply cable from the power supply.
- Plug the machine in.
- Turn the machine on.

**Does the primary fuse blow?**

**Yes No**

**006**

Go to Step 008.

**007**

The power supply assembly is failing.

---

**008**

(From step 006)

- Turn the machine off.
- Disconnect the options power supply cable from the CRT control board and any options boards if installed.

(Step 008 continues)

008 (continued)

- Check the options power supply cable for continuity between adjacent pins.

**Is there continuity?**

**Yes No**

**009**

Go to Step 011.

**010**

The options power supply cable is failing.

---

**011**

(From step 009)

- Connect the options power supply cable to the power supply and to the CRT control board.
- Turn the machine on.

**Does the primary fuse blow?**

**Yes No**

**012**

Go to Step 014.

**013**

The CRT control board is failing.

---

**014**

(From step 012)

**Are both the printer and diskette options installed?**

**Yes No**

**015**

**Is the printer option installed?**

**Yes No**

**016**

Go to Step 027 on page 2-178.

**017**

Go to Step 024 on page 2-178.

---

**018**

- Turn the machine off.
- Disconnect the printer option board from the diskette board.
- Connect the option power supply cable to the printer option board.
- Turn the machine on.

(Step 018 continues)

**018** (continued)

**Does the primary fuse blow?**

**Yes No**

**019**

Go to Step 021.

**020**

The printer option board is failing.

---

**021**

(From step 019)

- Turn the machine off.
- Connect the option power supply cable to the diskette control board.
- Turn the machine in.

**Does the primary fuse blow?**

**Yes No**

**022**

Go to "MAP 0100: Start" on page 2-4.

**023**

The diskette control board or disk drive are failing.

---

**024**

(From step 017)

- Turn the machine off.
- Disconnect the printer option board from the function board.
- Connect the options power supply cable to the printer option board.
- Turn the machine on.

**Does the primary fuse blow?**

**Yes No**

**025**

Go to "MAP 0100: Start" on page 2-4.

**026**

The printer option board is failing.

---

**027**

(From step 016)

**Is the diskette option installed?**

**Yes No**

**028**

Go to "MAP 0100: Start" on page 2-4.

**029**

- Turn the machine off and disconnect the diskette option from the function board.
- Connect the option power supply cable to the diskette control board.
- Turn the machine on.

**Does the primary fuse blow?**

**Yes No**

**030**

Go to "MAP 0100: Start" on page 2-4.

**031**

The diskette control board is failing.

— or —

The disk drive assembly is failing.

---

**032**

(From step 003)

- Turn the machine off.
- Set your meter to the **RX10K** scale.
- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-8 and the black meter lead (COM) connected to J5-2.

**Is the resistance less than 500 ohms?**

**Yes No**

**033**

- Check each of the following, in the order shown, for pin-to-housing shorts (check between the pins in the motor connector and the motor or solenoid housing):
  - transport motor
  - ribbon lift/feed motor
  - paperfeed motor
  - selection motor
  - print hammer solenoid.

**Do any of the motors have a pin-to-housing short?**

**Yes No**

**034**

The motor control board is failing.

**035**

The motor and the motor control board are failing.

---

**036**

The motor control board is failing.

---

## MAP 0460: Print Hammer Solenoid

**001**

- Turn the machine off.
- Disconnect the print hammer solenoid cable from the carrier cable board.
- Set the meter on **X1**.
- Carefully zero the meter.
- Measure the resistance of the print hammer solenoid on the print hammer cable connector as indicated in the chart below.

| Meter Connections | Reading |
|---|---|
| Pin 1 (HMR1) to Pin 2 (HMR2) | 2 to 4 ohms |
| Pin 1 (HMR1) to solenoid housing | Infinity |
| Pin 2 (HMR2) to solenoid housing | Infinity |

**Are the measurements correct?**

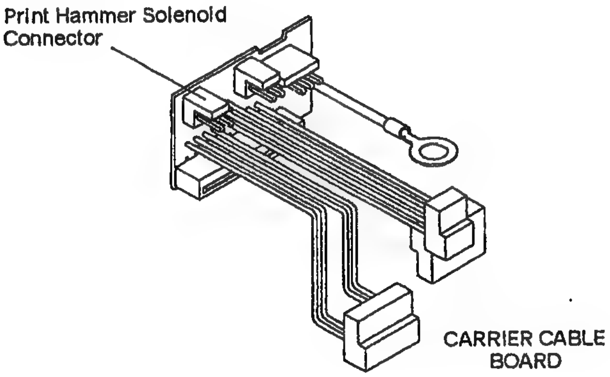
**Yes No**

**002**

Go to Step 010 on page 2-181.

**003**

- Check the continuity of the print hammer solenoid lines at the print hammer connector on the carrier cable board.



**Is there continuity?**

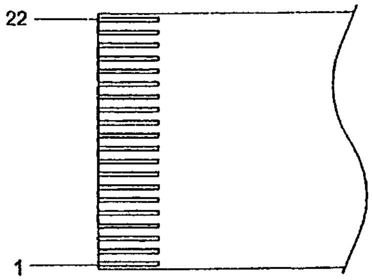
**Yes No**

**004**

The carrier cable board is failing.

**005**

– Check the continuity of lines 1, 2, 3, and 4 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

**Yes No**

**006**

The carrier cable is failing.

**007**

**Were you sent to this diagnostic from the Error Code MAP?**

**Yes No**

**008**

***Single board machines:***

Go to "MAP 0470: Print Quality" on page 2-184.

– or –

The system board is failing.

***Two-board machines:***

Go to "MAP 0470: Print Quality" on page 2-184.

– or –

The motor control board is failing.

– or –

The function board is failing.

**009**

***Single board machines:*** The system board is failing.

***Two-board machines:*** The motor control board is failing.

---

**010**

(From step 002)

**Are any solenoid pins shorted to the solenoid housing?**

**Yes No**

**011**

The selection plate assembly is failing.

**012**

(Step **012** continues)

**012** (continued)
***Single board machines:*** The system board and the selection plate assembly are failing.
***Two-board machines:*** The motor control board and the selection plate assembly are failing.

Notes

## MAP 0470: Print Quality

**001**

This chart lists the FRUs in the most probable order of failure.

**Note:** Print can be lightened by adding up to a maximum of two hammer solenoid shims (P/N 1342475), or darkened by removing shims.

| Symptom | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Malselection, split characters, or hammer marks | F | I | | | | |
| Missing character. Character impression is on the paper. | H | E | G | | | |
| Missing character. No character impression on the paper. | F | G | | | | |
| Impression is dark | G | F | | | | |
| Incorrect character alignment | F | G | D | C | A | |
| ~~Characters are light or have voids~~ | E | F | C | H | G | B |
| Erase is not complete | H | E | F | G | D | C |

| | FRU | Action |
|---|---|---|
| A | Bottom Cover | Check:<br>• Bottom cover. Is it bent or cracked?<br>• Frame latches. Are they damaged, cracked, or hard? |
| B | Cardholder | See "Cardholder Adjustment" on page 3-2. |
| C | Paperfeed | Check:<br>• Feed rollers. Are they worn or loose?<br>• Platen and platen latches. Are they worn? |
| D | Transport | Check:<br>• Transport assembly. Does it bind?<br>• Carrier bearings. Are they worn?<br>• Front carrier shoe. Is it worn?<br>• Transport belt. Is it loose or worn?<br>• Transport pulley. Is it loose, worn, or broken?<br>• Transport pulley motor mounting screws. Are they loose?<br>• Idler stud. Is it loose?<br>For electrical failures, Go to "MAP 0590: Transport Electrical" on page 2-224. |
| E | Ribbon/Tape | Be sure you are using a known good ribbon and correcting tape. |
| F | Printwheel | Check:<br>• Printwheel Cartridge. Does it bind?<br>• Petals. Are they defective or damaged? |

|  | FRU | Action |
|---|---|---|
| G | Selection Plate | See "Even Top and Bottom Printing Adjustment" on page 3-3. Check:<br>• Motor. Does it bind? Are the mounting screws loose? Is the connector loose?<br>• Hub. Is it bent, broken, or loose?<br>• Hammer: Does it bind? Does it have a loose head, a worn stop, or too much end play?<br>For electrical failures, Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.<br>**Note:** The hammer solenoid does not energize when the printwheel is removed or the machine is in the centering or decimal tab modes. |
| H | Ribbon Plate or Lift Asm | Check:<br>• Gears. Do they binds? Are they loose, or broken?<br>• Motor. Does it bind? Does it have loose mounting screws or a loose connector?<br>• Tape feed clutch, pin, link, and slot. Are they worn?<br>• Lift cam and roller. Are they worn?<br>• Lift stud. Is it loose?<br>See "Ribbon Lift Adjustment" on page 3-5.<br>For electrical failures, Go to "MAP 0500: Ribbon Electrical" on page 2-192. |
| I |  | Go to "MAP 0520: Selection" on page 2-198. |

## MAP 0480: Printer Option

**001**

- Turn the machine off.
- Check the cables for damage, proper alignment, and fit.

**Are the cables good?**

**Yes No**

**002**

Repair as necessary.

**003**

- Turn the machine off.
- Turn the machine on.
- Press Code + 5 to activate the printer option.

**WW10, 15, 1500, 3000 - Does the line space 1.5, 2 and 3 LEDS come on solid?**
**WW30, 35, 3500 - Does the message panel appear on the display?**
**WW50, 70, 5000, 7000 - Does the message panel appear on the CRT?**

**Yes No**

**004**

- Turn the machine off.
- Disconnect the printer option board.
- Turn the machine on.

**Does the machine operate correctly?**

**Yes No**

**005**

Go to "MAP 0100: Start" on page 2-4.

**006**

***Single board machines:***
The 22-pin cables between the system board and the printer option board are failing.
— or —
The printer option board is failing
— or —
The system board is failing

***Two-board machines:***
The 22-pin function to printer option board cables are failing.
— or —
The printer option board is failing
— or —
The function board is failing

**007**

- Press the 6 keybutton.

(Step **007** continues)

007 (continued)

**WW10, 15, 1500, 3000 - Does the 1.5 LED go off and the 2 and 3 LEDs stay on solid?**
**WW30, 35, 3500 - Does the NOT READY message appear on the display?**
**WW50, 70, 5000, 7000 - Does the NOT READY message appear on the CRT?**

Yes No

008

***Single board machines:***
The printer option board is failing.
— or —
The system board is failing.

***Two-board machines:***
The printer option board is failing.
— or —
The function board is failing.

009

— Press Code + 7.

**Does the platen turn?**

Yes No

010

— Turn the machine off.
— Disconnect the printer option board from the function board.
— Turn the machine on.

**Does the machine operate correctly?**

Yes No

011

The function board is failing.

012

— Check the continuity of the cables between the function board and the printer option board.

**Is there continuity?**

Yes No

013

One or both of the cables are failing.

014

The printer option board is failing.

015

— Turn the machine off.
— Install a printer option board.
— Turn the machine on.

(Step **015** continues)

**015** (continued)

- Press Code + 5.

**Does the printer option work correctly?**

**Yes No**

**016**

Inform the customer the machine is operating correctly.

**017**

End the call.

Notes

# MAP 0490: Ribbon and Correcting Tape

**001**

This chart lists the FRUs in the most probable order of failure.

| Symptom | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Light or dark characters | I | | | | |
| No lift | E | A | | | |
| Too much lift, not enough lift, feed is not correct | B | E | A | C | F |
| Too much feed, not enough feed, lift is not correct | G | C | F | A | |
| No ribbon feed | G | F | A | | |
| No correction tape feed | F | D | E | A | H |

| | FRU | Action |
|---|---|---|
| A | Feed/Lift Motor/Cable | Motor not running correctly, not turning, or noisy. Go to "MAP 0500: Ribbon Electrical" on page 2-192.<br>Check the gear. Is it loose, broken, or worn? |
| B | Ribbon Lift | Check the stud. Is it worn or loose?<br>See "Ribbon Lift Adjustment" on page 3-5. |
| C | Cartridge Latch | Check the latch. Is it worn, loose, or broken? |
| D | Tape Feed Stud | Is the stud worn or loose? |
| E | Lift Cam Assembly | Check:<br>• Cam and roller. Are they worn?<br>• Stud. Is it loose? |
| F | Ribbon Plate Assembly | Check:<br>• Feed gear train. Does it bind?<br>• Gears. Are they loose or broken?<br>• Motor. Is it loose?<br>• Tape feed slot. Is it worn?<br>• Tape feed link. Is it worn?<br>• Tape feed clutch. Is it worn?<br>• Backcheck mechanism. Is it worn, loose, or broken? |
| G | Ribbon/Correcting Tape Cartridges | Check the ribbon and correction tape. Are they broken or scratched? Do they wind correctly? |
| H | Cables and Electronics | Check the connectors. Are they loose or worn?<br>GO TO "MAP 0500: Ribbon Electrical" on page 2-192. |
| I | | Go to "MAP 0470: Print Quality" on page 2-184. |

Notes

## MAP 0500: Ribbon Electrical

**001**

- Type and correct a line of characters.

**Is the ribbon mechanism working correctly?**

**Yes No**

**002**

**Do you have a problem with ribbon feed?**

**Yes No**

**003**

Go to Step 006.

**004**

Go to Step 008.

---

**005**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

---

**006**

(From step 003)

**Do you have a problem with ribbon lift or a problem with the correcting tape feed or lift?**

**Yes No**

**007**

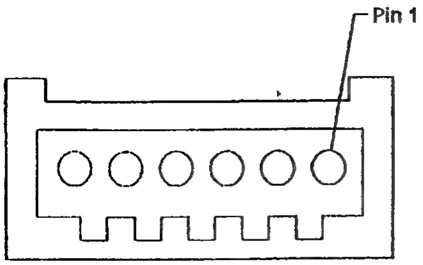
Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**008**

(From step 004)

- Turn the machine off.
- Set the meter on **X1**.
- Carefully zero the meter.
- Measure the resistance of the ribbon feed/lift motor between the points indicated in the chart below (these are critical measurements). To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

| Meter Connections On the Motor Connector | Reading |
|---|---|
| Pin 1 to Pin 5 | 11 to 16 ohms |
| Pin 2 to Pin 6 | 11 to 16 ohms |
| Pin 1 to Pin 2 or 6 | Infinity |
| Pin 2 to Pin 1 or 5 | Infinity |
| Pin 1 to Motor Housing | Infinity |
| Pin 2 to Motor Housing | Infinity |
| Pin 3 to Motor Housing | Infinity |
| Pin 4 to Motor Housing | Infinity |



MOTOR CONNECTOR

**Are the measurements correct?**
Yes No

**009**

**Are any motor pins shorted to the motor housing?**
Yes No

**010**

The ribbon lift/feed motor is failing.

**011**

***Single board machines:***
The function board and the ribbon lift/feed motor are failing.
***Two-board machines:***
The motor control board and the ribbon lift/feed motor are failing.

**012**

**Were you sent to this diagnostic from the error indications diagnostic?**
Yes No

**013**

Go to Step 015 on page 2-194.

**014**

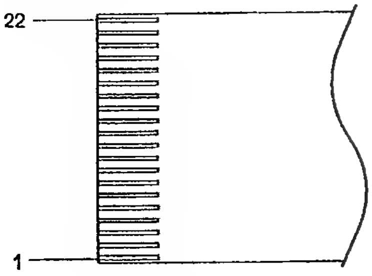
***Single board machines:***
The function board is failing.

***Two-board machines:***
The motor control board is failing.
— or —
The function board is failing.

**015**

(From step 013)

- Check the continuity of the ribbon lift/feed motor lines in the carrier cable. The lines are: 5, 8, 9, 10, 11, 12, 17, 18.



CARRIER CABLE

**Is there continuity?**

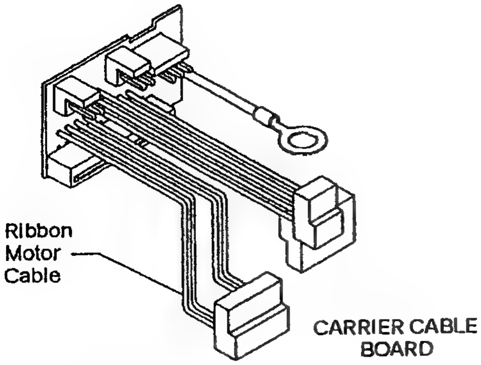
**Yes No**

**016**

The carrier cable is failing.

**017**

- Check the carrier cable board and the ribbon lift/feed motor cable for continuity.



**Is there continuity?**

**Yes No**

**018**

The carrier cable board is failing.

**019**

***Single board machines:***

The system board is failing.

— or —

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

***Two-board machines:***

The motor control board is failing.

(Step **019** continues)

**019** (continued)

– or –

The function board is failing.

– or –

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

## MAP 0510: Semi-Automatic Paper Insertion

**001**

- Inspect the SAPI switch, spring, cable, and actuator.
- Also inspect the paper deflector and feed rolls.

**Is the mechanical operation of the switch and paperfeed good?**

**Yes No**

**002**

Repair as necessary.

**003**

- Run the sensor and switch test (hold Code and Shift, press TSet).

**WW10, 15, 1500, 3000 - Does the Lang LED go on and off when the switch is activated?**
**WW30, 35, 50, 70, 3500, 5000, 7000 - Does the KYBD indicator turn on and off when the switch is activated?**

**Yes No**

**004**

- *Do not deactivate the sensor and switch test.*
- Do not disconnect the SAPI cables from the SAPI switch.
- Short the SAPI switch contacts.

**WW10, 15, 1500, 3000 - Does the LANG LED go on and off as you short the SAPI switch?**
**WW30, 35, 50, 70, 3500, 5000, 7000 - Does the KYBD indicator turn on and off as you short the SAPI switch?**

**Yes No**

**005**

Go to Step 008 on page 2-197.

**006**

The SAPI switch is failing.

**007**

Go to "MAP 0390: Paperfeed" on page 2-156.

**008**

(From step 005)
The SAPI connector number varies by machine model. Choose the correct connector for the machine:

| | |
|---|---|
| WW10 single board | J3 |
| WW15, 1500, 3000 all | J3 |
| WW35 all | J3 |
| WW50, 5000 single board | J3 |
| WW70, 7000 single board | J3 |
| WW10 two board | J4 |
| WW30 all | J8 |
| WW50 two board | J8 |
| WW70 two board | J9 |

**CAUTION:**
**Do not short SAPI connector pins 1 and 2 on the function board unless the switch and sensor test is activated.**

- Be sure the switch and sensor test is activated.
- Disconnect the SAPI connector from the function board.
- Short SAPI pins 1 and 2 together on the system board.

**WW10, 15, 1500, 3000 - Does the LANG LED go on and off as you short the pins?**
**WW30, 35, 50, 70, 3500, 5000, 7000 - Does the KYBD indicator go on and off as you short the pins?**

**Yes No**

**009**

The function board is failing.

**010**

The SAPI switch cable is failing.

## MAP 0520: Selection

**001**

This chart lists the FRUs in the most probable order of failure.

| Symptom | 1 | 2 | 3 |
|---|---|---|---|
| Printwheel does not rotate, is noisy, or its speed changes as it rotates | B | A | |
| Carrier malselects, splits characters, or makes print hammer marks | B | A | |
| Carrier drives against right side frame. | A | B | |
| Print hammer does not energize. | A | B | |
| Character substitution | A | B | C |

| | FRU | Action |
|---|---|---|
| A | Selection Plate Assembly | Check:<br>• Motor, Does it bind? Does it have loose screws or a loose connector?<br>• Hub. Is it bent, broken, or loose?<br>• Hammer. Does it bind or have excessive end play? If the hammer solenoid does not energize, Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.<br>For electrical failures, Go to "MAP 0530: Selection Electrical" on page 2-200. |
| B | Printwheel | Check:<br>• Printwheel. Does it bind? Is the cartridge broken?<br>• Printwheel petals. Are they bent or broken?<br>• Bias spring.<br>For electrical failures, Go to "MAP 0530: Selection Electrical" on page 2-200. |
| C | Function board or system board | The function board or system board is failing |

## Notes

## MAP 0530: Selection Electrical

**001**

**Does the machine complete a POR?**

Yes No

**002**

Go to Step 005.

**003**

- Type several full lines of the lowercase characters "a n e" to test the motor coils.

**Does this combination of characters print correctly?**

Yes No

**004**

Go to "MAP 0520: Selection" on page 2-198.

**005**

(From step 002)

**Is a known good printwheel available?**

Yes No

**006**

Go to Step 010.

**007**

- Try a known good printwheel in the machine.

**Does the machine operate correctly now?**

Yes No

**008**

Go to Step 012 on page 2-201.

**009**

The original printwheel is failing.

---

**010**

(From step 006)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes are open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.

**Is the printwheel good?**

Yes No

**011**

The printwheel is failing.

**012**

(From step 008)
- Turn the machine off.
- Check for binds in the selection motor.

**Is the selection motor good?**

**Yes No**

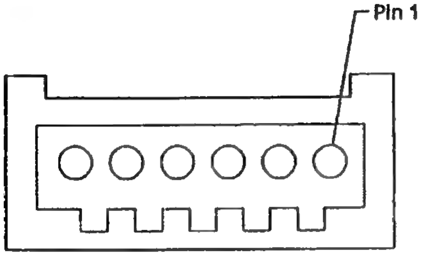
**013**

The selection plate assembly is failing.

**014**

- Turn the machine off.
- Disconnect the Selection motor cable from the selection motor.
- Set the meter on **X1**.
- Carefully zero the meter.
- Measure the resistance of the selection motor between the pins indicated (these are critical measurements).
- To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

| Meter Connections On the Motor Connector | Reading |
|---|---|
| Pin 1 to Pin 5 | 11 to 15 ohms |
| Pin 2 to Pin 6 | 11 to 15 ohms |
| Pin 1 to Pin 2 or 6 | Infinity |
| Pin 2 to Pin 1 or 5 | Infinity |
| Pin 1 to Motor Housing | Infinity |
| Pin 2 to Motor Housing | Infinity |
| Pin 5 to Motor Housing | Infinity |
| Pin 6 to Motor Housing | Infinity |



MOTOR CONNECTOR

**Are the measurements correct?**

**Yes No**

**015**

(Step **015** continues)

**015** (continued)

**Are any pins shorted to the motor housing?**

**Yes** **No**

**016**

The selection plate assembly is failing.

**017**

***Single board machines:*** The system board and selection plate assembly are failing.
***Two-board machines:*** The motor control board and selection plate assembly are failing.

**018**

– Check the continuity between the carrier cable board and the selection motor cable.

**Is there continuity?**

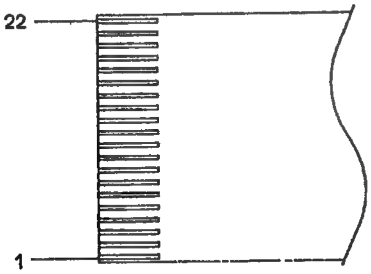
**Yes** **No**

**019**

The carrier cable board is failing.

**020**

– Check the continuity of the selection lines in the carrier cable. The lines are: 13, 14, 15, 16.



CARRIER CABLE

**Is there continuity?**

**Yes** **No**

**021**

The carrier cable is failing.

**022**

**Were you sent to this MAP from "MAP 0520: Selection" on page 2-198?**

**Yes** **No**

**023**

Go to "MAP 0520: Selection" on page 2-198.

**024**

***Single board machines:*** The system board is failing.
(Step **024** continues)

**024** (continued)
— or —
The selection plate assembly is failing.

***Two-board machines:*** The 22-pin cable is failing.
The motor control board is failing.
— or —
The function board is failing.
— or —
The selection plate assembly is failing.

## MAP 0540: Sheetfeed

**Note:** Do a visual check of the machine before you continue with this MAP. Look for loose connections, broken wires, and loose or broken wires.

**001**

— Check the following chart for your *identical* condition and perform the required action. If you do not find an *identical* condition, go to "MAP 0540: Sheetfeed."

| Condition | Action |
|---|---|
| The primary fuse in the typewriter blows only when the sheetfeed is installed. | Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| The typewriter functions properly but the sheetfeed is totally inoperative (No motor movement, solenoid does not activate). | Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| The typewriter functions properly but the sheetfeed will not feed from the correct bin. | Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| When Code + 7 is pressed the typewriter turns the platen until the 3.5 second typewriter timeout occurs. The sheetfeed does not respond and there is an out-of-paper indication. | Check the out-of-paper sensor for correct adjustment and operation. If the out-of-paper sensor is correct go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper, but the sheetfeed drive motor rotates and the bin feed roller shaft rotates. | Mechanical, Check for:<br>• Open load levers<br>• Weak load lever springs<br>• Slipping rollers<br>• Glazed or damaged rollers,<br>• Tight paper guides<br>• Paper curl, incorrect paper, high humidity<br>Electrical, check:<br>• Logic board assembly<br>• Feedtrip sensor assembly<br>• Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper. The sheetfeed drive motor rotates, but the bin feed roller shaft does not rotates. | Mechanical, Check for:<br>• Drive motor binding on bin gear<br>• Incorrect gear backlash<br>• Loose drive motor gear<br>• Drive motor gear and bin gear not engaging<br>• Loose or broken bin gear. |
| When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper. The sheetfeed drive motor and the bin feed roller shaft do not rotate. | Mechanical, Check for:<br>• Broken or worn gears in gear train.<br>Electrical: Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |

| **Condition** | **Action** |
|---|---|
| When Code + 7 is pressed the typewriter responds correctly. Sheetfeed does not feed from the selected bin but will feed from the other bin. | Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| When Code + 7 is pressed the typewriter responds correctly, but the sheetfeed does not open the typewriter paper bail. | Mechanical, Check for:<br>• Broken solenoid spring<br>• Broken or binding solenoid lever<br>• Broken or worn gears.<br>Electrical:<br>• Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |
| When Code + 7 is pressed the typewriter responds correctly, but the exit feed rollers do not rotate. | Check the sheetfeed drive belt.<br>Check for worn or broken gears. |
| When Code + 7 is pressed the typewriter responds (platen turns), but there is no response when Code + 8 is pressed. | Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206. |

## MAP 0550: Sheetfeed, Electrical

**001**

**Are you here because the typewriter primary fuse is blown?**

Yes No

**002**

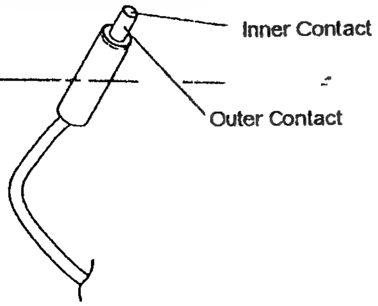
Go to Step 016 on page 2-207.

**003**

- Set your meter to the RX 1K scale.
- Set the meter polarity switch to +.

**Note:** To read the resistance of the sheetfeed power plug, the red meter lead (VOM) must be connected to the inner contact and the black meter lead (COM) must be connected to the outer contact of the sheetfeed power plug.

- Measure the resistance between the inner and outer contacts of the sheetfeed power plug.



**Is the resistance less than 500 ohms?**

Yes No

**004**

- Turn the machine off.
- Install the sheetfeed onto the machine.
- Turn the machine on.

**Does the primary fuse blow again?**

Yes No

**005**

Go to Step 016 on page 2-207.

**006**

- Replace the primary fuse.

Go to Step 010 on page 2-207.

---

**007**

- Unscrew the black plastic sleeve on the sheetfeed power plug and slide it up the cable.
- Check for a short (touching contacts or leads) between the inner and outer contacts in the plug.

(Step 007 continues)

007 (continued)

**Is there a short?**

**Yes No**

**008**

The logic board assembly is failing.

**009**

Repair the plug if possible.

— or —

The logic board assembly is failing.

---

**010**

(From step 006)

- Turn the machine off.
- Set the meter to the RX1 scale and carefully zero the meter.
- Disconnect the power cable from the sheetfeed drive motor.
- Measure the resistance of the motor between pins one and three at the connector on the motor board.

**Is the resistance less than 25 ohms?**

**Yes No**

**011**

- Connect the sheetfeed drive motor.

Go to Step 013.

**012**

The sheetfeed drive motor assembly is failing.

---

**013**

(From step 011)

- Disconnect the solenoid cable from the power cable.
- Measure the resistance of the solenoid between pin 1 and pin 3 on the solenoid cable connector.

**Is the resistance less than 40 ohms?**

**Yes No**

**014**

The logic board is failing.

— or —

The sheetfeed drive motor is failing.

— or —

The solenoid assembly is failing.

**015**

The solenoid assembly is failing.

---

**016**

(From steps 002 and 005)

(Step **016** continues)

**016** (continued)

- Turn the machine off.
- Install the sheetfeed onto the typewriter. Be sure the gears between the sheetfeed and platen mesh correctly. Also be sure the sheetfeed correctly activates the sensor assembly on the typewriter.
- Turn the machine on.
- Hold Code and press 7.

**Does the typewriter respond?**

**Yes No**

**017**

Go to Step 023.

**018**

**Does the sheetfeed respond (drive motor turns, solenoid activates)?**

**Note: The sheetfeed exit shaft is driven by the typewriter and may rotate at this time.**

**Yes No**

**019**

- Hold Code and press 8.

**Does the typewriter respond?**

**Yes No**

**020**

Go to Step 043 on page 2-210.

**021**

Go to Step 052 on page 2-211.

---

**022**

Go to Step 057 on page 2-212.

---

**023**

(From step 017) .

- Hold Code and press 8.

**Does the typewriter respond?**

**Yes No**

**024**

Go to Step 026.

**025**

Go to Step 040 on page 2-210.

---

**026**

(From step 024)

(Step **026** continues)

**026** (continued)

- If your machine is a Wheelwriter 30, 35, 50, 70, 3500, 5000, or 7000 go to Step 033.
- If your machine is a Wheelwriter 10, 15, 1500, or 3000 check the printer option for proper operation.
- Hold Code and press 5. The typewriter should go into the print mode.
- Hold Code and press 5 to exit.

**Does the printer option operate correctly?**

Yes No

**027**

Go to the Maintenance Information manual for the machine you are working on.

**028**

ROS module U10, PN 1432213 must be installed on the printer option board for sheetfeed operation.

**Is ROS module U10, PN 1432213 installed on the printer option board?**

Yes No

**029**

Install the ROS module.

**030**

**Is the ROS module installed correctly, facing the correct direction, with no bent pins, and with all pins in the socket?**

Yes No

**031**

Install the module correctly.

**Note:** If the module was installed in the wrong direction, it may be damaged.

**032**

The printer option board is failing.

---

**033**

(From step 026)

**Is a printer option installed on your machine?**

Yes No

**034**

The typewriter function board is failing.

**035**

ROS module U10, PN 1432209 must be installed on the printer option board for sheetfeed operation.

**Is ROS module U10, PN 1432209 installed on the printer option board?**

Yes No

**036**

Install the ROS module.

037

**Is the ROS module installed correctly, (facing the correct direction, with no bent pins, and with all pins in the socket)?**

**Yes No**

038

Install the module correctly.

**Note:** If the module was installed in the wrong direction, it may be damaged.

039

The typewriter function board is failing.

---

040

(From step 025)

– Activate the switch and sensor test (Code + Shift + Tabset).

***Wheelwriter 10, 15, 1500, 3000:*** the linespace 2 LED should be on solid.

***Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:***

- With sheetfeed sensor assembly plugged into the function board, PLAY should appear on the display.
- With sheetfeed sensor assembly plugged into the printer option board, CENTER should appear on the display.

**Is the correct indicator displayed?**

**Yes No**

041

Go to Step 043.

042

***Wheelwriter 10, 15, 1500, 3000:*** The printer option board is failing.

***Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:*** The function board is failing.

– or –

The printer option board is failing.

---

043

(From steps 020 and 041)

**Is the sheetfeed adapter kit paper handler sensor assembly installed and adjusted correctly with sheetfeed installed?**

**Yes No**

044

Correctly install and adjust the sensor assembly.

045

***Wheelwriter 10, 15, 1500, 3000:*** The adapter kit sensor assembly connects to the printer option board.

***Wheelwriters 30, 35, 50, 70, 3500, 5000, 7000:*** The adapter kit sensor assembly connects to the function board.

(Step **045** continues)

**045** (continued)

**Is the sensor properly connected?**

**Yes No**

**046**

Correctly install the sensor assembly.

**047**

- Remove the sheetfeed from the typewriter.
- Ensure the switch and sensor test is activated.
- Manually operate the sensor switch until both switches activate.

**Wheelwriter 10, 15, 1500, 3000: Does the linespace 2 LED turn on?**
**Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:**

- **Does the PLAY indicator display (sensor cable connected to the function board)?**
- **Does the CENTER indicator display (sensor cable connected to the printer option board)?**

**Yes No**

**048**

- Disconnect the sensor switch cable from the printer option board or the function board.
- Check the continuity of the cable as you activate the sensor switch.

**Is there continuity?**

**Yes No**

**049**

The sensor switch assembly is failing.

**050**

Go to Step 051.

---

**051**

(From step 050)
***Wheelwriter 10, 15, 1500, 3000:*** The printer option board is failing.
***Wheelwriter 30, 35, 50, 3500, 5000, 7000:*** The function board is failing.
— or —
The printer option board is failing.

---

**052**

(From step 021)

- Measure the voltage between the black (GND) and red (36VDC) leads on the sheetfeed logic board.
  **CAUTION:**
  **Do not short the two leads together.**

**Does the voltage measure between 23 V d.c. and 41 V d.c.?**

**Yes No**

**053**

(Step **053** continues)

053 (continued)

- Measure the voltage on the bottom of the options power cable at the sheetfeed power jack.

  **CAUTION:**

  **Do not short the two leads together.**

**Does the voltage measure between 23 V d.c. and 41 V d.c.?**

Yes No

**054**

Go to Step 064 on page 2-214.

**055**

The sheetfeed logic board assembly is failing.

---

**056**

The sheetfeed logic board assembly is failing.

---

**057**

(From step 022)

- Check the following chart for your *identical* condition and perform the required action.

| **Condition** | **Action** |
|---|---|
| • The correct bin is selected when Code + 8 is pressed.<br>• The typewriter responds correctly when Code + 7 is pressed.<br>• The sheetfeed motor does not turn.<br>• The sheetfeed solenoid activates.<br>• An out-of-paper indicator appears. | Go to Step 061 on page 2-213. |
| • The correct bin is selected when Code + 8 is pressed.<br>• The typewriter responds correctly when Code + 7 is pressed.<br>• The sheetfeed motor turns.<br>• The sheetfeed solenoid does not activate.<br>• The paper bail does not open.<br>• The sheetfeed feeds paper but may try to feed more than one sheet at a time. | Go to Step 058 on page 2-213. |
| • The correct bin is selected when Code + 8 is pressed.<br>• The typewriter responds correctly when Code + 7 is pressed.<br>• The sheetfeed operates correctly when bin 1 is selected.<br>• When bin 2 is selected:<br>The sheetfeed motor does not turn.<br>The sheetfeed solenoid does not activate.<br>An out-of-paper indicator appears. | The feedtrip sensor is failing,<br>or<br>the logic board assembly is failing. |

| Condition | Action |
|---|---|
| • The correct bin is selected when Code + 8 is pressed.<br>• The typewriter responds correctly when Code + 7 is pressed.<br>• The sheetfeed operates correctly when bin 2 is selected.<br>• When bin 1 is selected:<br>The sheetfeed motor does not turn.<br>The sheetfeed solenoid does not activate.<br>An out-of-paper indicator appears. | The feedtrip sensor is failing,<br>or<br>the logic board assembly is failing. |
| The machine will not select the correct bin. | The feedtrip sensor is failing,<br>or<br>the logic board assembly is failing. |
| • The correct bin is selected when Code + 8 is pressed.<br>• The typewriter responds correctly when Code + 7 is pressed.<br>• The sheetfeed motor turns on and feeds a sheet of paper.<br>• The paper buckles up against the feedstop sensor.<br>• The 3.5 second sheetfeed timeout occurs.<br>• The sheetfeed motor stops turning.<br>• The paper does not feed into the typewriter.<br>• An out-of-paper indicator appears. | The feedtrip sensor is failing,<br>or<br>the logic board assembly is failing. |

---

**058**

(From step 057)

— Disconnect the solenoid.

— Measure the resistance of the solenoid between the two pins on the plug.

**Is the resistance less than 30 ohms?**

Yes **No**

**059**

The logic board assembly is failing.

**060**

The sheetfeed solenoid is failing.

---

**061**

(From step 057)

— Disconnect the sheetfeed drive motor.

— Measure the resistance of the motor between the two pins at the connector on the motor board.

**Is the resistance less than 20 ohms?**

Yes **No**

**062**

The logic board assembly is failing.

**063**

(Step **063** continues)

**063** (continued)
The sheetfeed drive motor is failing.

---

**064**

(From step 054)
- Disconnect the options power cable from J2 on the power supply and any option boards installed in the machine.
- Measure the voltage at J2-1 ( +32VDC) on the power supply.

**Does the voltage measure between 23 V d.c. and 41 V d.c.?**

**Yes No**

**065**

The power supply is failing.

**066**

The option power supply cable is failing.

Notes

# MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

**Note:** *If you disconnect the batteries from the function board, all data stored in the machine will be lost. If you need to remove the Spell Check module from the function board, you must disconnect the batteries. Discuss the problem with the customer before you disconnect the batteries.*

**Note:** If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to Step 017 on page 2-217.

**001**

**Did you come here from "MAP 0170: Error Codes" on page 2-48?**

**Yes No**

**002**

- Enter the Spell Check function.

**Does the machine enter the Spell Check function?**

**Yes No**

**003**

Go to Step 006.

**004**

Go to Step 014 on page 2-217.

**005**

Go to Step 014 on page 2-217.

**006**

(From step 003)

**Does the code keybutton work with any other coded function?**

**Yes No**

**007**

Go to "MAP 0260: Keyboard" on page 2-96.

**008**

**Does the Supplemental Dictionary lose words?**

**Yes No**

**009**

Go to Step 013 on page 2-221.

**010**

- Measure the voltage between J7-1 (black) and J7-3 (red) on the J7 plug.

(Step **010** continues)

**010** (continued)

***Two battery machines:***
**Does the voltage measure between 2.3 V dc and 3.2 V dc?**
**Three battery machines: Does the voltage measure between 3.3 V dc and 4.8 V dc?.**

**Yes No**

**011**

– Check the continuity of the battery holder.
**Does it have continuity?**
**Yes No**

**012**

The battery holder is failing.

**013**

The batteries are failing.

---

**014**

(From steps 004 and 005)
**Is the Spell Check modules (U201, U700, U801—two board machines; U3 or U800—single board machines) socketed?**
**Yes No**

**015**

The function board is failing.

**016**

***Single board machines:*** The Spell Check module (U3 or U800) is failing.
– or –
The system board is failing.

***Two-board machines:*** The Spell Check modules (U201, U700, U801) is failing.
– or –
The function board is failing.

---

**017**

(From page 2-216)
**Did you come here from Map 0160: Error Code?**
**Yes No**

**018**

Go to Step 024 on page 2-218.

**019**

– Turn the machine off.
(Step **019** continues)

**019** (continued)
- Check the spelling modules (U201, U801, U700—two board machines; U3 or U800—single board machines) for proper installation.

**Is the module properly installed?**

**Yes No**

**020**

- Observe all ESD precautions.
- Disconnect the batteries.
- Correctly install the spelling module.
- Turn the machine on.

**Do you still have the same symptom?**

**Yes No**

**021**

Go to "MAP 0100: Start" on page 2-4.

**022**

The spelling module is failing.
— or —
The function board is failing.

**023**

The spelling module is failing.
— or —
The function board is failing.

**024**

(From step 018)

**Does the code keybutton work with any other coded function?**

**Yes No**

**025**

Go to "MAP 0260: Keyboard" on page 2-96.

**026**

The spelling module is failing.
— or —
The function board is failing.

Notes

## MAP 0570: Spell Check Option—Wheelwriter 10, 15, 1500, 3000

**001**

Check the machine Spell Check option configuration against the table below.

| | **WW1500, 3000 U800 Module Installed** | **WW10, 15 U3 Module Installed** | **WW10, 15 J6 Jumper Installed** |
|---|---|---|---|
| US | No | No | No |
| UK | Yes | Yes | No |
| French | Yes | Yes | Yes |
| German | Yes | Yes | Yes |
| Spanish | Yes | Yes | Yes |

**Note:** U.S. spell check is standard on all machines and is part of the U101 module on the system board. There is no J6 jumper on WW1500, 3000.

Any other combinations may cause a ROM scan error.

**Is the Spell Check option configured correctly for your machine?**

**Yes No**

**002**

- Configure correctly.
- Go to"MAP 0100: Start" on page 2-4.

**003**

- Enter the Spell Check function.

**Does the machine enter the Spell Check function?**
**Three battery machines: Does the voltage measure between 3.3 V dc and 4.8 V dc?**

**Yes No**

**004**

**Does the code keybutton work with any other coded functions?**

**Yes No**

**005**

Go to"MAP 0260: Keyboard" on page 2-96.

**006**

Go to Step 013 on page 2-221.

---

**007**

(Step 007 continues)

007 (continued)

**Does the Supplemental Dictionary lose words?**

**Yes No**

**008**

Go to Step 013.

**009**

- Measure the voltage between J7-1 (black) and J7-3 (red) on the J7 plug.

***Two battery machines:*** **Does the voltage measure between 2.3 V dc and 3.2 V dc?**

***Three battery machines:*** **Does the voltage measure between 3.3 V dc and 4.8 V dc?**

**Yes No**

**010**

- Check the continuity of the battery holder.

**Does it have continuity?**

**Yes No**

**011**

The battery holder is failing.

**012**

The batteries are failing.

---

**013**

- W.T. only - Carefully remove the spell check module (U3 or U800) from the system board. If there is a jumper in J6, remove it.

**Does the U.S. Spell Check work properly?**

**Yes No**

**014**

The system board is failing.

**015**

- U.S. only - Go to "MAP 0100: Start" on page 2-4.
- Check the continuity of the J6 jumper.

**Does it have continuity?**

**Yes No**

**016**

The J6 jumper is failing.

**017**

The U3 or U800 module is failing.

---

## MAP 0580: Transport

**001**

This chart lists the FRUs in the most probable order of failure.

| SYMPTOM | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Little or no carrier movement | D | C | B | |
| Transport is erratic or noisy<br>Characters overlap<br>Characters too close<br>Selection poor<br>Horizontal alignment not correct<br>Margin changes | D | B | C | A |
| Noisy transport | D | C | B | |

**Note:** Turn the machine off when you check for binds.

| | FRU | Action |
|---|---|---|
| A | Bottom Cover | Check:<br>• Cover. Is it bent or cracked?<br>• Frame latches. Are they damaged, cracked, or hard? |
| B | Carrier Bearings and Shaft | Check:<br>• Bearings and shaft. Are they dirty, loose, or worn? Are they correctly lubricated?<br>• Carrier. Does it hit the feed rollers? |
| C | Transport Motor | If the motor is noisy or does not run correctly, go to "MAP 0590: Transport Electrical" on page 2-224. Check.<br>• Shaft. Does it bind?<br>• Mounting screws. Are they loose? |
| D | Transport Assembly | Check:<br>• Drive gear train and bearings. Do they bind, or are they worn?<br>• Idler pulley. Does it bind, or is it worn?<br>• Carrier bearings. Do they bind, or are they worn?<br>• Belt. Is it broken or worn. Is it correctly adjusted?<br>• Belt clamp. Is it loose, worn, or broken?<br>• Load spring. Is it missing or bent?<br>• Brackets. Are they loose?<br>• Idler stud. Is it loose?<br>• Cardholder. Is it binding against the platen? |

Notes

## MAP 0590: Transport Electrical

**001**

***Single board machines:*** Go to Step 003.

***Two-board machines:***

- Check the 16- and 22-pin cables connecting the motor control board and the function board for alignment, correct fit, rolled edges and damaged corners. The cables may shift out of adjustment when you remove the board cover.

**Are the cables good?**

**Yes No**

**002**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

**003**

- Tab to the right frame, then carrier return.

**Does the transport motor operate correctly?**

**Yes No**

**004**

Go to Step 006.

**005**

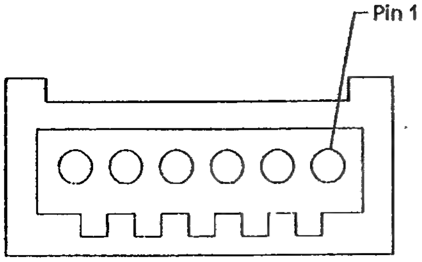
Go to "MAP 0580: Transport" on page 2-222.

**006**

(From step 004)

- Turn the machine off
- Disconnect the transport motor cable from the motor.
- Set the meter on **X1**.
- Carefully zero the meter.
- Measure the resistance of the transport motor (on the motor connector) between the points indicated in the chart below (these are critical measurements). To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

| Meter Connections | Reading |
|---|---|
| Pin 1 to Pin 3 | 3 to 5 ohms |
| Pin 2 to Pin 4 | 3 to 5 ohms |
| Pin 1 to Pin 5 | 4 to 6 ohms |
| Pin 2 to Pin 6 | 4 to 6 ohms |
| Pin 1 to Pins 2, 4, 6 | Infinity |
| Pin 2 to Pins 1, 3, 5 | Infinity |
| Any pin to Motor Housing | Infinity |



MOTOR CONNECTOR

**Is the resistance correct?**

**Yes No**

**007**

**Are any motor pins shorted to the motor housing?**

**Yes No**

**008**

The transport motor is failing.

**009**

***Single board machines:*** The transport motor and the function are failing.

***Two-board machines:*** The transport motor and the motor control board are failing.

**010**

– Check all the lines of the transport motor cable for continuity.

**Is there continuity?**

**Yes No**

**011**

The transport cable is failing.

**012**

**Are you here because:**

- **Wheelwriter 10, 15, 1500, 3000 - error indication of 6 beeps and the 1,2,3 LEDs flashing?**
- **Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000 - error code 215?**

**Yes No**

013

Go to "MAP 0580: Transport" on page 2-222.

014

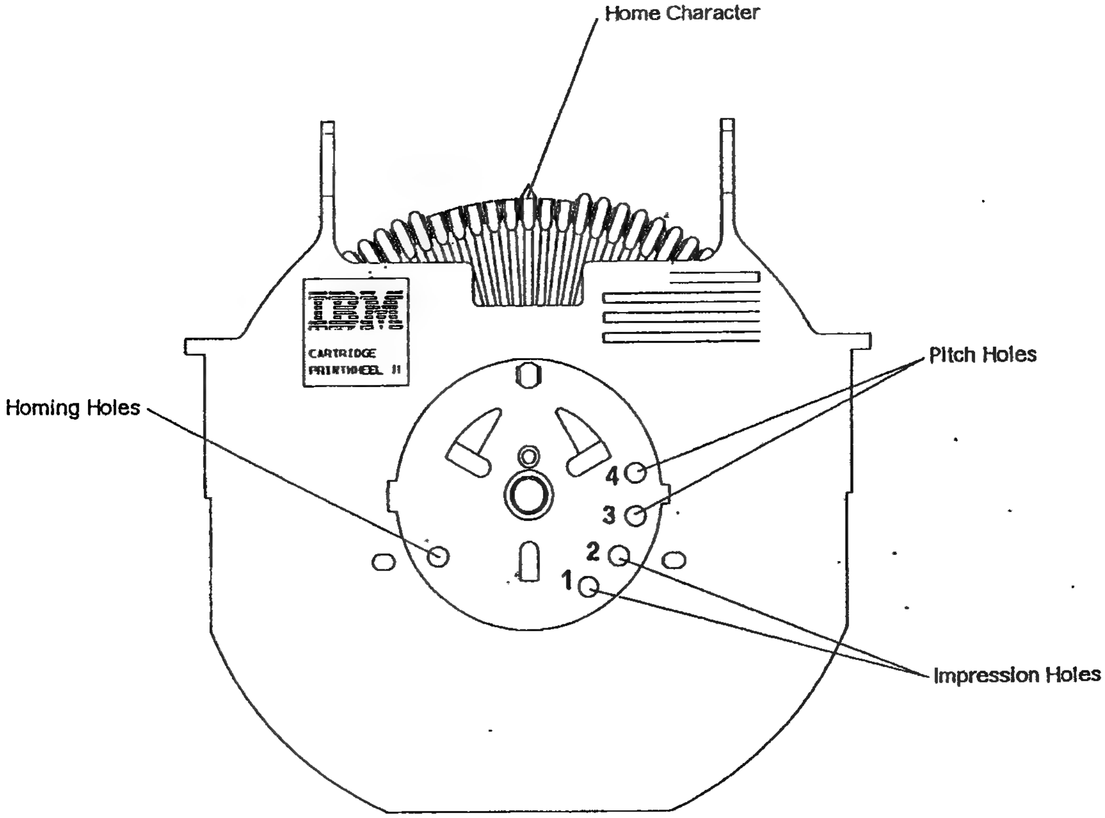
***Single board machines:*** The function board is failing.
***Two-board machines:***
The 16-pin cable between the function board and motor control board is failing.
— or —
The 22-pin cable between function board and motor control board is failing.
— or —
The motor control board is failing.
— or —
The function board is failing.

## Diagnostic Aids

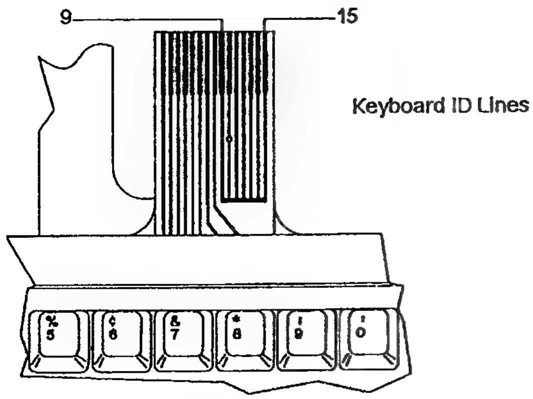
### Printwheel Hole Code Chart

- Holes 1 and 2 control impression.
- Holes 3 and 4 control pitch.

| 1 | 2 | 3 | 4 | Pitch | Impression |
|---|---|---|---|---|---|
| | | | | 10 | Light |
| O | | | | 10 | Medium |
| | O | | | 10 | Heavy |
| | | O | O | 12 | Light |
| O | | O | O | 12 | Medium |
| | O | O | O | 12 | Heavy |
| | | | O | 15 | Light |
| O | | | O | 15 | Medium |
| | O | | O | 15 | Heavy |
| | | O | | PS | Light |
| O | | O | | PS | Medium |
| | O | O | | PS | Heavy |



## Keyboard Identification Hole Charts



### Keyboard Identification Hole Chart, Wheelwriter 10, 15

| Keyboard Name | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| Belgium/France | | O | O | | | | |
| Brazil | | O | | O | | O | |
| Bulgaria | | | | O | O | | |
| Canada (Bilingual) | | | | O | | | |
| Czech Republic | | O | | O | O | | |
| Denmark | | O | | O | | | |
| Germany/Austria | | O | | | | | |
| Greece (Greek) | | | | | O | O | |
| Hungary | | | O | O | | O | |
| Italy (Metric index) | | O | | | O | | |
| Italy (Inch index) | | | | | O | | |
| Japan (English) | | O | O | | O | | |
| Latin American, Period | | | | O | O | | |
| Latin American, Comma | | O | | O | O | | |
| Netherlands | | | O | O | O | | |
| Norway | | O | O | O | O | | |
| Philippines | | | | O | O | | |
| Poland | | | O | | O | O | |
| Portugal | | | | | | O | |
| Romania | | O | O | O | | O | |
| Russia Cyrillic | | | O | | O | | |
| Serbia | | | O | O | | | |
| Slovakia | | O | | O | | O | |
| South Africa | | | O | O | | O | |

| Keyboard Name | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| Spain |  | O |  |  |  | O |  |
| Sweden/Finland |  | O | O | O |  |  |  |
| Switzerland (French) |  |  | O |  |  | O |  |
| Switzerland (German) |  | O | O |  |  | O |  |
| Turkey |  | O | O | O |  | O |  |
| United Kingdom |  |  |  | O |  | O |  |
| United States |  |  |  |  |  |  |  |

## Keyboard Identification Hole Chart, Wheelwriter 1500, 3000

| Keyboard Name | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| Belgium/France |  | O | O |  |  |  |  |
| Brazil |  | O |  | O |  | O |  |
| Bulgaria |  |  | O |  |  |  |  |
| Canada (Bilingual) |  |  |  | O |  |  |  |
| Croatia/Slovenia (WW 1500) |  | O |  | O | O | O |  |
| Croatia/Slovenia (WW 3000) |  | O | O | O | O | O |  |
| Czech Republic |  | O | O | O |  |  |  |
| Denmark |  | O |  | O |  |  |  |
| Germany/Austria |  | O |  |  |  |  |  |
| Greece (Greek) |  |  |  |  | O | O |  |
| Hungary |  | O |  |  | O | O |  |
| Italy (Metric index) |  | O |  |  | O |  |  |
| Italy (Inch index) |  |  |  |  | O |  |  |
| Japan (English) |  | O | O |  | O |  |  |
| Latin American, Period |  |  |  | O | O |  |  |
| Latin American, Comma |  | O |  | O | O |  |  |
| Netherlands |  |  | O | O | O |  |  |
| Norway |  | O | O | O | O |  |  |
| Philippines |  |  | O |  | O | O |  |
| Poland |  |  | O | O | O | O |  |
| Portugal |  |  |  |  |  | O |  |
| Romania |  | O | O |  | O | O |  |
| Russia Cyrillic |  |  |  | O | O | O |  |
| Serbia |  | O |  | O | O | O |  |
| Slovakia |  |  | O |  | O |  |  |

| Keyboard Name | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| South Africa | | | O | O | | O | |
| Spain | | O | | | | O | |
| Sweden/Finland | | | O | O | | | |
| Switzerland (French) | | | O | | | O | |
| Switzerland (German) | | O | O | | | O | |
| Turkey | | O | O | O | | O | |
| United Kingdom | | | | O | | O | |
| United States | | | | | | | |
| Yugoslavia | | O | | O | O | O | |

## Keyboard Identification Hole Chart, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000(*)

| Keyboard Name | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| Brazil | | O | | O | | O | |
| Bulgaria | | | | O | O | | |
| Croatia/Slovenia | | | O | O | | | |
| Canada (Bilingual) | | | | O | | | |
| Czech-Republic | | O | | O | O | | |
| France(Belgian/Dutch) | | | O | | | | |
| France (Belgian-French) | | O | O | | | | |
| Denmark | | O | | O | | | |
| Finland | | | O | O | | | |
| Germany/Austria | | O | | | | | |
| Greece (Greek) | | | | | O | O | |
| Hungary | | | O | O | | O | |
| Italy (Metric index) | | O | | | O | | |
| Italy (Inch index) | | | | | O | | |
| Japan (English) | | O | O | | O | | |
| Latin American, Period | | | | O | O | | |
| Latin American, Comma | | O | | O | O | | |
| Latin American, Period (English) (Philippines) | | | O | | O | O | |
| Netherlands | | | O | O | O | | |
| Norway | | O | O | O | O | | |
| Poland | | | O | | O | O | |
| Portugal | | | | | | O | |

| **Keyboard Name** | **09** | **10** | **11** | **12** | **13** | **14** | **15** |
|---|---|---|---|---|---|---|---|
| Romania |  | O | O | O |  | O |  |
| Russian Cyrillic |  |  | O |  | O |  |  |
| Serbia |  |  | O | O |  |  |  |
| Slovakia |  | O |  | O |  | O |  |
| South Africa |  |  | O | O |  | O |  |
| Spain |  | O |  |  |  | O |  |
| Sweden |  | O | O | O |  |  |  |
| Switzerland (French) |  |  | O |  |  | O |  |
| Switzerland (German) |  | O | O |  |  | O |  |
| Turkey |  | O | O | O |  | O |  |
| United Kingdom (all except WW70, 7000) |  |  |  | O |  | O |  |
| United Kingdom (WW70, 7000 only) |  |  |  |  |  |  |  |
| United States |  |  |  |  |  |  |  |
| (*) WW70, 7000 use only the U.S. and U.K. Keyboards |  |  |  |  |  |  |  |

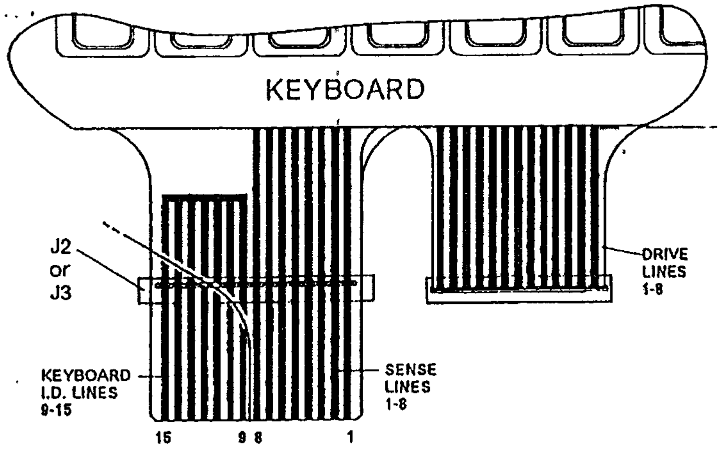
## Keyboard Country ID Modification

Every keyboard has keyboard ID lines with country punch codes located on the flat cable next to the sense lines.

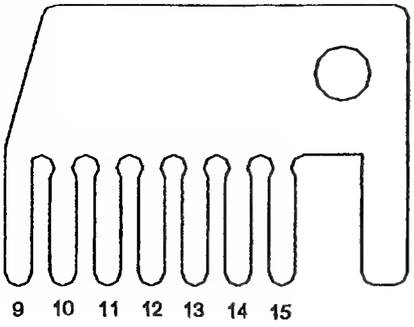
To change the country code, or to avoid having to replace a keyboard with damaged ID lines, cut off the ID lines and replace them with a metal comb (P/N 1392956).

To cut and replace the ID lines:

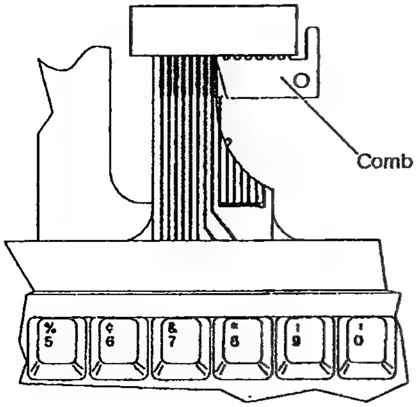
1. Move the carrier to the left.
2. Disconnect the right-hand flat cable.
3. Turn the machine around until the back is facing you.
4. Using a pair of scissors, cut the country ID section (as shown in the figure below) between line 8 and 9, making a straight cut for 20mm (3/4 inch). Gradually turn the cut to the left until you reach the edge. **This must be one continuous cut from start to finish, with no sharp corners.**



5. Turn the machine back around to the operator position.
6. Using a small pair of pliers, remove the tabs on the comb (as shown in the figure below) to match the keyboard identification holes for the country you are changing to (see "Keyboard Identification Hole Charts" on page 2-228).



7. Install the flat cable and comb in the function board connector (as shown in the figure below).



   a. Place the remaining portion of the keyboard cable in the connector.

   b. Install the comb.

      The large tab on the comb should touch the outer edge of the connector to properly align the comb in the connector.

   c. Push down the connector locking mechanism (if zero-insertion force type).

To check whether the keyboard is functioning properly:

1. Place the proper country printwheel in the machine and turn the typewriter on.

   If the machine beeps and the green linespacing LEDs (1, 1 1/2, 2) flash, then the country code is incorrect. Either the comb is installed incorrectly or the wrong tabs were removed.

2. Place a blank sheet of paper in the machine and press every keybutton.

   If a section or the complete keyboard is inoperative, the sense flat cable is not connected properly. As you press each keybutton, make sure that the appropriate character is typed or function performed.

## Power On Reset (POR) Sequence, Wheelwriter 10, 15, 1500, 3000

| **Power On Reset Sequence** |
|---|
| Turn the machine on. |
| All LEDs are turned on |
| Keyboard is verified.<br>Invalid keyboard causes error code on indicator panel. |
| Printwheel moves. |
| Carrier moves. |
| Platen moves up and down one line. |
| Ribbon lifts. |
| Print hammer energizes. (May be difficult to see this.) |
| Carrier moves to the right. |
| Printwheel and ribbon home. |
| Carrier homes. |
| If a printwheel or transport sense error is detected, error indicators are turned on. |
| All LED indicators turn off. |
| Destructive RAM test performed on correction buffer.<br>If test fails, error indicators turn on. |
| If spell check is installed and activated, the machine will beep two times. The sound will depend on how the operator has set Code + 4. |
| Machine beeps one time. |
| Carrier moves to the left margin. |
| Battery status is determined.<br>Dead or low battery causes error code. |
| Line space indicator last selected by the operator turns on. |

## Power On Reset (POR) Sequence, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

| Power On Reset Sequence |
|---|
| Turn the machine on. |
| The LCD display goes blank (all PELs off). |
| Keyboard is verified.<br>An invalid keyboard will display an error code. |
| The printwheel moves approximately three revolutions. |
| Carrier moves. |
| Platen moves up and down one line. |
| Print hammer energizes. (May be difficult to see this.) |
| Carrier moves to the right. |
| Printwheel and ribbon home. |
| Carrier homes. |
| If a printwheel or transport sense error is detected an error code will be displayed. |
| Carrier moves to the left margin. |
| Machine beeps one time. |
| If spell check is installed and activated, the machine will beep two times. The sound will depend on how the operator has set Code + 4. |
| The machine will beep three times if the battery is low. |
| Cursor, linespace symbol, and linespace number is displayed (warm start).<br>Storage cleared message, linespace symbol, and linespace number is displayed (cold start). |
| The diskette will initialize if it is installed. |
| LO-BATT will be displayed if the batteries are low. |
| Error code 161 will be displayed if the diskette control board is in the machine without the diskette option-drive cable being attached to it. |

## Play-In-Loop Test, Wheelwriter 10, 15, 1500, 3000

To run the play-in-loop test:

1. Type the test phrase or words you want to use into the correction buffer.
2. Press and hold both the Code and Shift keybuttons then press the Tab Clear keybutton.
3. The words will play-in-loop until you stop it.
4. Press any keybutton to stop the play-in-loop test.

**Note:** The machine will perform a SAPI operation when you exit the test.

## Play-In-Loop Test, Wheelwriter 30, 35, 50, 3500, 5000

The play-in-loop test is run using document storage. To create the play-in-loop test phrase:

1. Open a document for your test phrase by pressing STORE + nn (nn = any number 1 to 99).
2. Type the test phrase or words you want to use into storage. Any machine function may be used to test the machine, such as; bold, continuous underscore, stop codes, or pitch/wheel changes.
3. Press and hold both the Code and Shift keybuttons then press the Tab Clear keybutton to close the document storage.

To run the play-in-loop test:

1. Press PLAY + the storage number of the test phrase.
2. The words will play-in-loop until you stop it. Press any keybutton to stop the play-in-loop test. To resume the play-in-loop test, press the END keybutton. To cancel the play-in-loop test, press the PLAY keybutton.
3. To store the play-in-loop document, press the STORE keybutton.
4. To erase the play-in-loop document, press DEL + nn.
5. You may also store your play-in-loop document on a diskette if the diskette option is installed.

**Note:** The machine will perform a SAPI operation when you exit the test.

## Play-In-Loop Test, Wheelwriter 70, 7000

To run the play-in-loop test:

1. Go to typewriter mode.
2. Type the play-in-loop phrase you want. ***Do not press CRTN at the end of your phrase.***
3. Press Code + Shift + Tab Clear.
4. Press the exit key to stop play-in-loop.

## Sensor and Switch Test, Wheelwriter 10, 15, 1500, 3000

**To run the sensor and switch test:**

1. Press and hold the Code and Shift keybuttons then press the Tab Set keybutton.
2. Press any keybutton to stop the sensor and switch test.

**To check the homing sensor: (A RTN LED)**

- When you activate the sensor and switch test, the A RTN LED should come on.
- Slowly push the homing sensor flag in. The A RTN LED should go off. The A RTN LED should come on as you release the flag.

**To check the SAPI switch: (LANG LED)**

- Activate the sensor and switch test.
- Pull the right paper bail all the way forward. The LANG LED should come on when the SAPI switch closes and go off as the paper bail is released.

**To check Spelling RAM: (WW10, 15 REPRT FULL LED), (WW1500 - CAPS LED), (WW3000 - PLAY LED)**

- If the LED indicated is on all the time during the sensor and switch test, the Spelling RAM is installed and working. If the Spelling RAM is not installed, or is defective, a system board failure error code will occur.

**To check the Ribbon Sensor: (BOLD LED)**

- Remove the ribbon cartridge from the machine.
- Activate the switch and sensor test.
- Pass a piece of paper between the ribbon LED and sensor.
- The BOLD LED should go on and off as the paper passes between the LED and the sensor.

**To check the Out-of-Paper Sensor: (CONT LED)**

- Remove any paper from the machine.
- Activate the switch and sensor test.
- Pass a piece of white paper between the platen and out-of-paper sensor.
- The CONT LED should go on and off as the paper passes between the platen and the sensor.

**To check for Low Battery: (WW10, 15 - CAPS LOCK LED), (WW1500 - FULL LED), (WW3000 - NO PRINT LED)**

- Activate the switch and sensor test.
- Disconnect the battery from J7 on the function board.
- The LED indicated should turn on when you disconnect the battery, and turn off when you connect the battery.
- Reconnect the battery.

**To check the Pinwheel Form Feeder Present: (Linespace 3 LED)**

- Activate the switch and sensor test.
- Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
- The Line space 3 LED should come on.

**To check the Sheetfeed Option Present: (Linespace 2 LED)**

- Activate the switch and sensor test.
- Manually depress the sheetfeed sensor switch until both switches activate.
- The Line space 2 LED should come on as the switch is activated.

## Sensor and Switch Test, Wheelwriter 30, 35, 3500

The sensor and switch test cannot be run from the Store mode.

**To run the sensor and switch test:**

1. Press and hold the Code and Shift keybuttons then press the Tab Set keybutton.
2. Press any keybutton to stop the sensor and switch test.

**To check the homing sensor: (ARTN)**

- When you activate the sensor and switch test, ARTN should come on the display.
- Slowly push the homing sensor flag in. ARTN should go off. ARTN should come on as you release the flag.

**To check the SAPI (paper bail) switch: (KYBD)**

- Activate the sensor and switch test.
- Pull the right paper bail all the way forward. KYBD should appear on the display as the SAPI switch closes and go off as the paper bail is released.

**To check Spelling RAM: (STORE)**

- If STORE is on the display during the sensor and switch test, the Spelling RAM is installed and working.

**To check the End-of-Ribbon Sensor: (BOLD)**

- Activate the switch and sensor test.
- Pass a piece of paper between the ribbon LED and sensor.
- BOLD should go on and off as the paper passes between the LED and the sensor.

**To check the Out-of-Paper Sensor: (CONT)**

- Activate the switch and sensor test.
- Pass a piece of white paper between the platen and out-of-paper sensor.
- CONT should go on and off as the paper passes between the platen and the sensor.

**To check for Low Battery: (CAPS)**

- Activate the switch and sensor test.
- Disconnect the battery from J4 on the function board.
- CAPS should appear on the display when you disconnect the battery, and turn off when you connect the battery.
- Reconnect the battery.

**To check the Pinwheel Form Feeder Present:**

1. ***When the pinfeed/sheetfeed sensor switch cable is connected to the printer option board.***
   - Activate the switch and sensor test.
   - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
   - TADJ should appear on the display as the switch is activated.
2. ***When the pinfeed/sheetfeed sensor switch cable is connected to the function board.***
   - Activate the switch and sensor test.
   - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
   - SUSPND should appear on the display as the switch is activated.

**To check the Sheetfeed Option Present:**

1. ***When the pinfeed/sheetfeed sensor switch cable is connected to the printer option board.***
   - Activate the switch and sensor test.

  - Manually depress the pinfeed sensor switch actuators until both switches activate.
  - CENTER should appear on the display as the switch is activated.
2. *When the pinfeed/sheetfeed sensor switch cable is connected to the function board.*
  - Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch actuators until both switches activate.
  - PLAY should appear on the display as the switch is activated.

## Sensor and Switch Test, Wheelwriter 50, 70, 5000, 7000

**To run the test:**

1. Press and hold the Code and Shift keybuttons then press the Tab Set keybutton.
2. A switch and sensor test menu will appear on the CRT.
3. Wheelwriter 50: Press any key to stop the test. Wheelwriter 70: Press EXIT to stop the test.

**To check the Homing Sensor: (ARTN)**

- When you activate the sensor and switch test, ARTN should come on the CRT.
- Slowly push the homing sensor flag in. ARTN should go off and come on as you release the flag.

**To check the SAPI (Paper bail) switch: (KYBD)**

- Activate the sensor and switch test.
- Pull the right paper bail all the way forward and KYBD should come on when the SAPI switch closes and go off as the paper bail is released.

**To check the End of Ribbon Sensor: (BOLD)**

- Activate the switch and sensor test.
- Remove the ribbon cartridge from the machine.
- Pass a piece of paper between the ribbon LED and Sensor.
- BOLD should go on and off as the paper is passed between the LED and sensor.

**To check the Out of Paper sensor: (CONT)**

- Activate the switch and sensor test.
- Pass a piece of white paper between the platen and the out of paper sensor.
- CONT should go off and on as you pass the paper between the platen and sensor.

**To check for Low Battery: (CAPS)**

- Activate the switch and sensor test.
- Disconnect the battery from J4 on the function board.
- CAPS should appear on the display when you disconnect the battery, and turn off when you connect the battery.
- Reconnect the battery.

**To check the Pinwheel Form Feeder Present:**

1. *When the pinfeed/sheetfeed sensor switch cable is connected to the printer option board.*
  - Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
  - TADJ should appear on the display as the switch is activated.
2. *When the pinfeed/sheetfeed sensor switch cable is connected to the function board.*
  - Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
  - SUSPND should appear on the display as the switch is activated.

**To check the Sheetfeed Option Present:**

1. ***When the pinfeed/sheetfeed sensor switch cable is connected to the printer option board.***
   - Activate the switch and sensor test.
   - Manually depress the pinfeed sensor switch actuators until both switches activate.
   - CENTER should appear on the display as the switch is activated.
2. ***When the pinfeed/sheetfeed sensor switch cable is connected to the function board.***
   - Activate the switch and sensor test.
   - Manually depress the pinfeed sensor switch actuators until both switches activate.
   - PLAY should appear on the display as the switch is activated.

## Diskette Diagnostic Tests

**CAUTION:**
*You must use a scratch diskette to run these tests. You must prepare or format the diskette before you run the test. This will destroy all data on the diskette. Be sure to use a diskette that does not contain useful data. To prepare or format a diskette:*

- WW30, WW35, WW50, WW3500, and WW5000 – Select PREPARE from the menu and prepare a diskette.
- WW70, WW7000 – Select FORMAT A DISKETTE from the word processor menu and format a diskette.

To enter the diskette diagnostic test routine:

1. Hold down the Code and Shift keybuttons then press the = keybutton.
2. A test menu will appear on the display. The menu has the following choices:
   - TEST -- Test diskette hardware
   - MEASURE -- Measure diskette signals
   - WRITE PROTECT -- Test write-protect and change line
3. To select a test, move the cursor to the test and press CRTN.
4. Press the erase key to stop a test and return to the service menu.

**Diskette Diagnostic Tests:**

TEST – This diagnostic test consists of the following:

- Diskette speed test
- Diskette controller test
- Diskette format test
- Diskette write/read track 0 and 79 test
- Diskette random sector/track read/write test

If this test is successful the routine returns to the test menu. If any errors occur during the diskette tests, an error displays indicating the nature of the problem. If an error code occurs, the following appears on the display:

(error symbol) NNN XY PRESS crtn to continue

Press CRTN to return to the service menu, then refer to "MAP 0170: Error Codes" on page 2-48 To run the test:

1. Select TEST from the service menu.
2. Insert scratch diskette and press the CRTN key.

If successful the routine will return you to the service menu. If TEST fails an error code will be displayed. If you want to continue press crtn otherwise go to "MAP 0170: Error Codes" on page 2-48

MEASURE – This test runs a fixed set of operations repetitively, ignoring all errors. You do not need to run this test to service the diskette drive on this machine. Instead, go to "MAP 0130: Diskette Option" on page 2-24. If you should enter this test accidentally, press the erase key to stop.

WRITE-PROTECT — This test checks the write-protect function of the diskette drive. To run the test:

1. Select the Write-Protect function from the service menu.
2. Insert a prepared scratch diskette. Be sure the write-protect window in the diskette is open before you insert it.
3. Press the CRTN key.
4. IF the diskette change line and write-protect line are active the test will complete and return you to the service menu. If either of these lines is not active a write-protect error code will display.

   (error symbol) 003        Press crtn to continue

5. If error code 003 occurs do the following, verify the write-protect window was open for the test, then go to "MAP 0130: Diskette Option" on page 2-24.

# Repair Information

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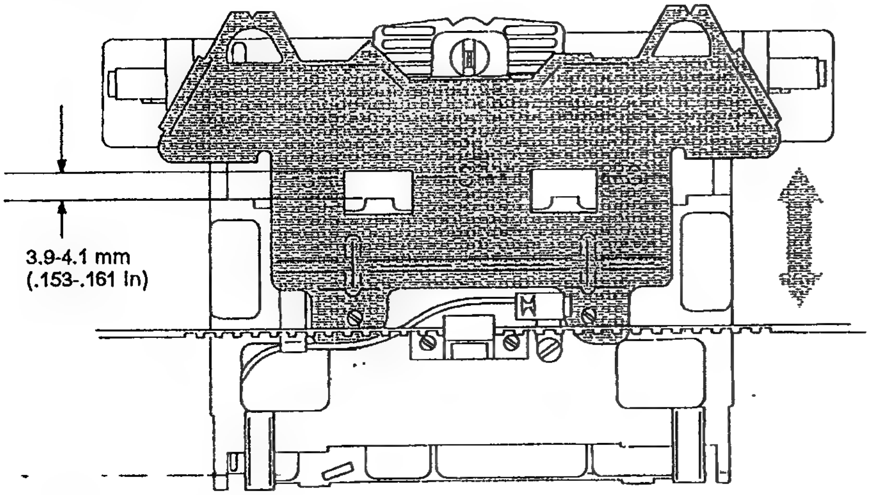
# Adjustment Procedures

## Cardholder Adjustment

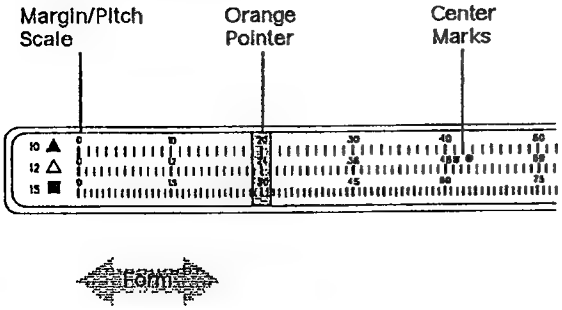
Position the cardholder so it clears the lugs on the back of the carrier by 3.9 to 4.1 mm (.153 to .161 in).



(Rear View)

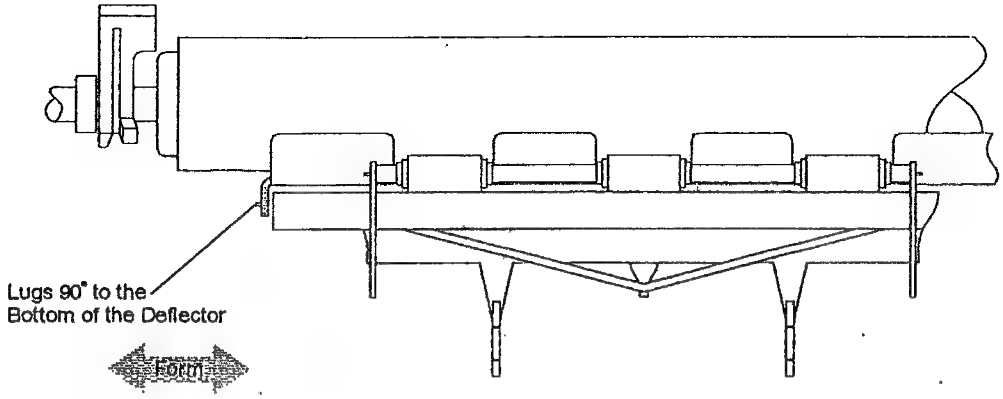
## Carrier Pointer Adjustment

Form the pointer so the line on the front of it aligns with the zeros on the margin scale. Check positions 70 and 100 also. Distribute the tolerances between 0 and 70.



## Deflector Adjustment

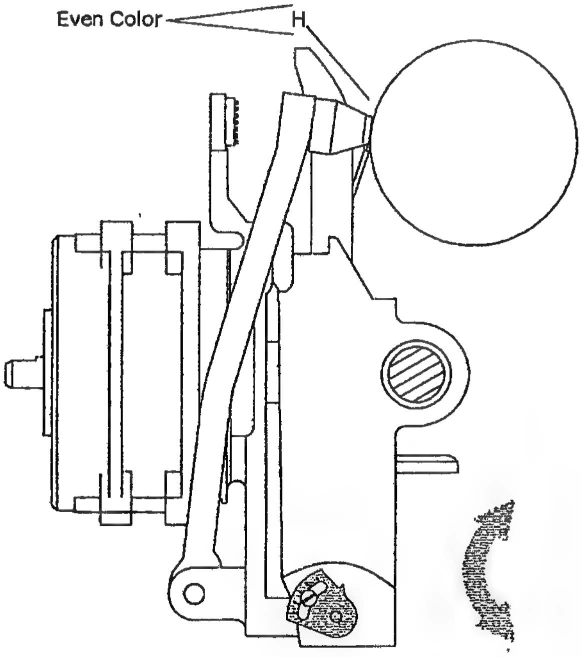
Form the deflector lugs so they are 90° to the bottom of the deflector.



(Front View)

## Even Top and Bottom Printing Adjustment

1. Check the platen bushings for wear before you make this adjustment.
2. Adjust the selection plate eccentrics for even top and bottom printing.

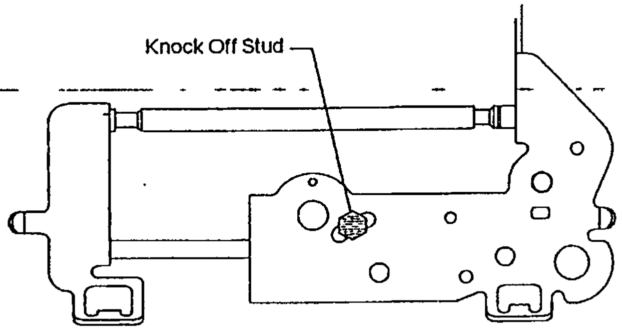


(Right Side View)

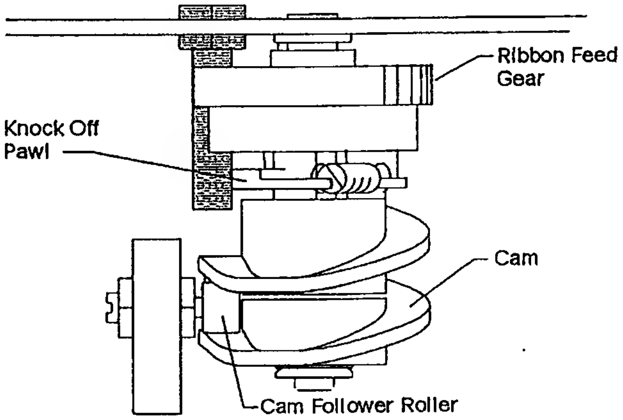
## Ribbon Lift Knock-Off Adjustment

The ribbon lift adjustment must be correct before making this adjustment. Make this adjustment with the ribbon plate installed.

1. Loosen the nut on the bottom of the knock-off stud. You may need to move the carrier position indicator to the side.
2. Hold the rear of the ribbon plate down and rotate the ribbon feed gear counterclockwise until the cam stops moving.
3. Adjust the knock-off to the left or right until the knock-off (black) pawl is clearly disengaged from the gear and there is a clearance of .5 to 1 mm (.020 to .04 in) between the cam follower roller and the end of the cam track. Rotate the cam by hand to check for this clearance.
4. Tighten the nut and check the adjustment. To check the adjustment, turn the ribbon feed gear counterclockwise. If it binds or stops turning, the adjusting stud is too far to the left in the slot. The white pawl will continue to ratchet as you rotate the gear. The black pawl must disengage. Readjust if necessary.
5. The gear should turn smoothly and the plate should not jump as you hold the rear of the ribbon plate down and rotate the gear. If it does not turn smoothly, the adjusting stud is too far to the right in the slot.



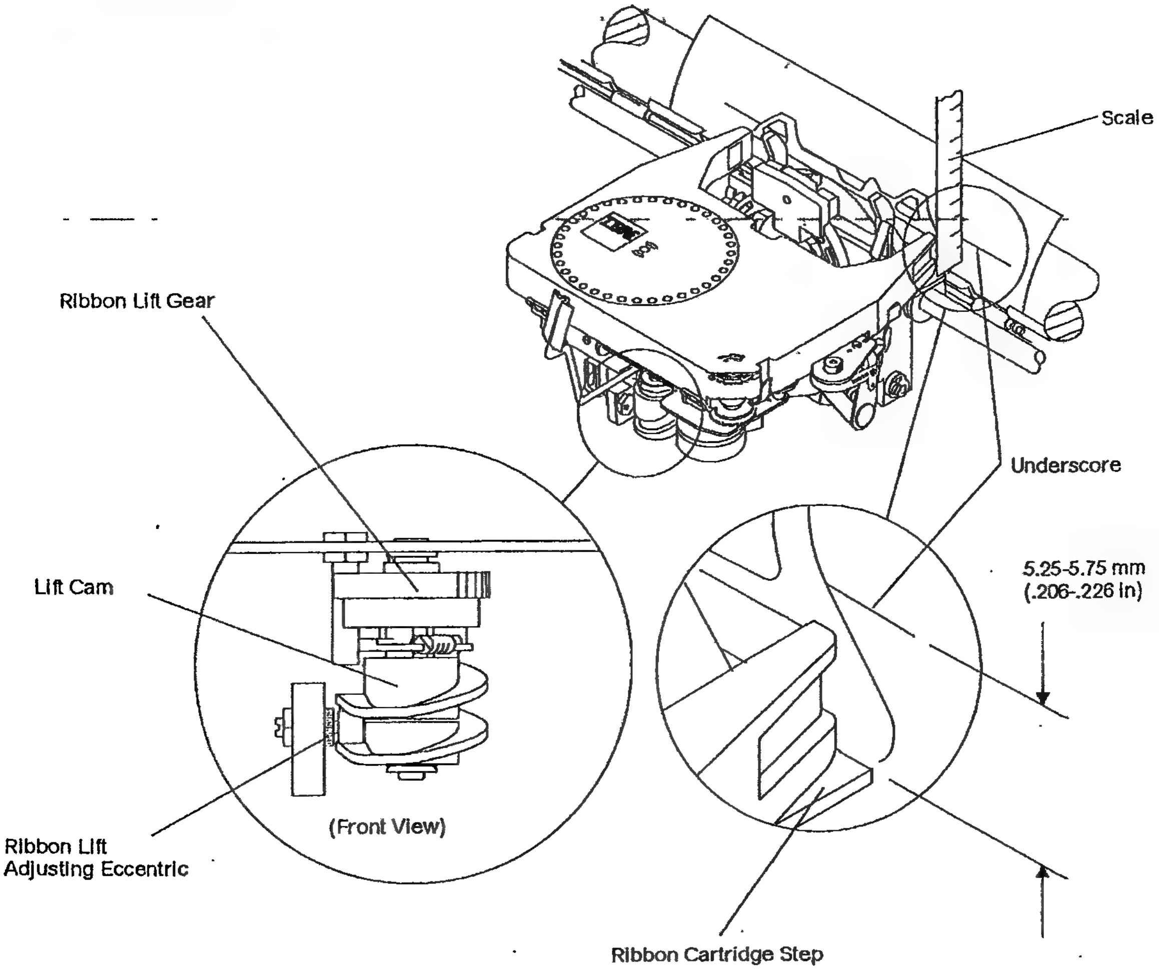
(Top View)



(Front View)

## Ribbon Lift Adjustment

1. Turn the machine on and leave it while you make this adjustment.
2. Remove the correction cartridge and reinstall the ribbon cartridge by itself.
3. Type a line of underscores.
4. Backspace the carrier until at least 10 mm (0.4 in) of the line of underscores is visible to the right of the cardholder.
5. Rotate the ribbon lift gear counterclockwise until the lift cam stops turning.
6. Use a scale to measure the vertical distance between the top of the step on the ribbon cartridge and the line of underscores. The distance should be 5.25 to 5.75 mm (.206 to .226 in).
7. Adjust the ribbon lift adjusting eccentric for a clearance of 5.25 to 5.75 mm (.206 to .226 in) between the step on the cartridge and the line of underscores. **The highest point of the ribbon lift eccentric must be forward of the centerline of its mounting screw.**
8. Check the ribbon lift knock-off adjustment and correct it if necessary. See page 3-4.



## Ribbon Lift Adjustment for Thailand, Arabic, and Farsi Printwheels

These machines have a beige-colored ribbon cartridge latch with two cartridge latching surfaces:

- Front (highest) for Thailand, Arabic, and Farsi printwheels
- Rear (lowest) for other printwheels.

To adjust the ribbon lift:

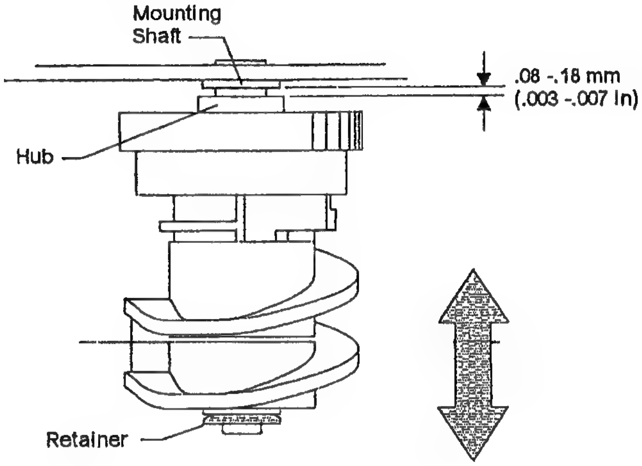
- Install the ribbon/tape cartridge assembly under the front (highest) step of the latch.
- Type eight each of the highest and lowest characters.
- Adjust the ribbon lift eccentric so the distance between the bottom of the ribbon and the lowest part of the lowest character is equal to the distance between the top of the ribbon and the top of the highest character. This distance is measured on the ribbon and should be .8mm. **The highest point of the ribbon lift eccentric must be forward of the centerline of its mounting screw.**
- Check the ribbon lift knockoff adjustment and correct if necessary. See "Ribbon Lift Knock-Off Adjustment" on page 3-4.

## Ribbon Lift Cam End-Play Adjustment

Make this adjustment whenever you replace the retainer.

1. Adjust the ribbon lift cam retainer up or down for a clearance of .08 to .18 mm (.003 to .007 in) between the shoulder of the mounting shaft and the hub on the top of the gear.

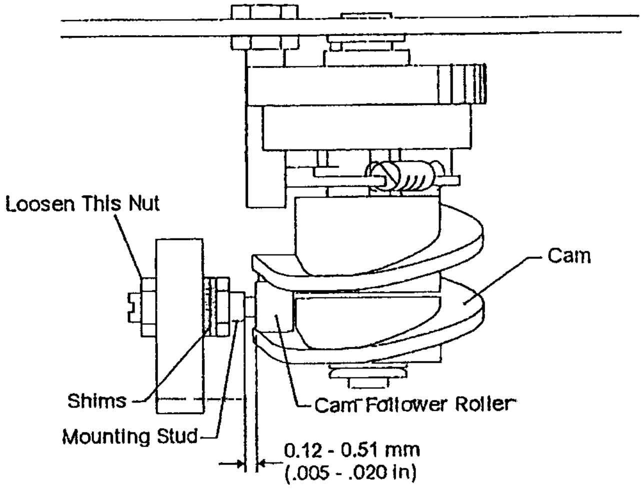
**Note:** The retainer can only be pushed in one direction. To make the adjustment, place a feeler gauge between the shoulder of the mounting shaft and the hub on the top of the gear, then push the retainer up on the shaft until the parts are pushed against the feeler gauge.



## Ribbon Lift Cam Follower Roller End-Play Adjustment

**Note:** Later level machines have a fixed cam follower stud instead of a cam follower roller and do not require this adjustment.

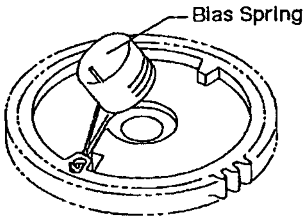
1. Push the ribbon lift cam follower roller to the right, against the ribbon lift cam.
2. Check for 0.12 - 0.51mm (.005 - .020 in) clearance between the roller and the mounting stud.
3. If the clearance is too great, loosen the mounting nut and install another shim. If you install another shim, recheck the Ribbon Lift Adjustment on page 3-4.

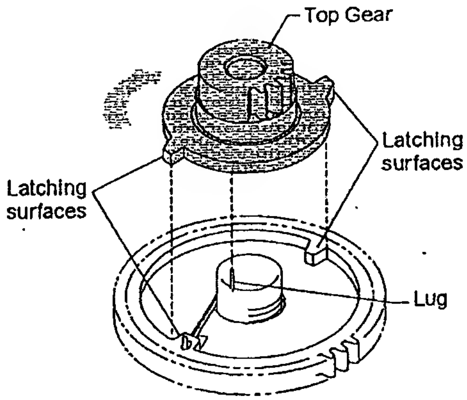


## Ribbon Feed Gear Bias Spring Adjustment

1. Install the spring in the bottom gear as shown.
2. Place the top gear over the bias spring as shown. The vertical lug on the spring must fit into one of the holes inside the top gear.
3. Rotate the top gear 1/2 turn clockwise and latch it in place. The spring should load the latching surfaces of the two gears against each other. Hold the gears in place until you have installed the ribbon feed motor in the machine. The spring will unwind if you do not hold the gears together.

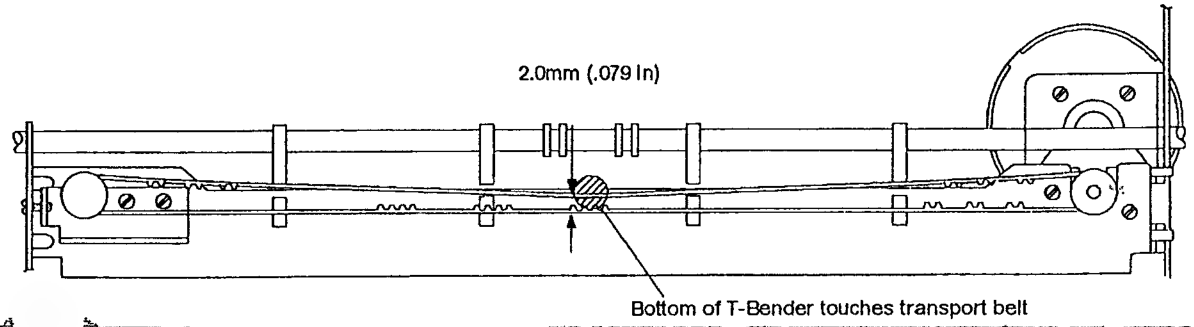
**Note:** After you have installed the motor, rotate the top gear 1/4 turn clockwise and let go. The gear should return to the initial position.



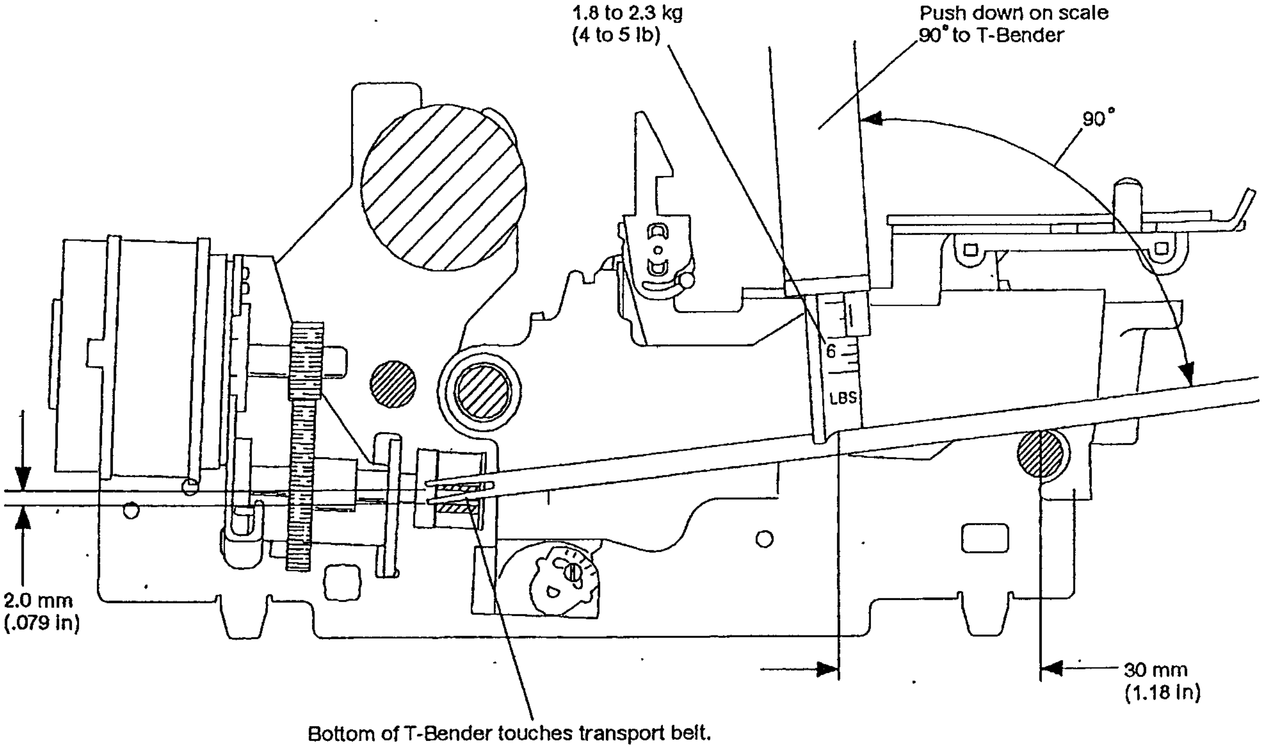


## Transport Belt Adjustment

1. Move the carrier all the way to the right.
2. Set the keyboard height to its lowest position.
3. Loosen the idler pulley bracket mounting screws.
4. Slide the T-Bender on the top transport belt at the center of the belt.
5. Rest the T-Bender on the carrier shaft.
6. Hold the scale 90 degrees to the T-Bender. Put 1.8 to 2.3 kg (4 to 5 lb) pressure on the T-Bender 30 mm (1.18 in) from the center of the carrier shaft.
7. Turn the adjusting screw in or out so the bottom of the T-Bender touches the transport belt.



(Front View)



(Side View)

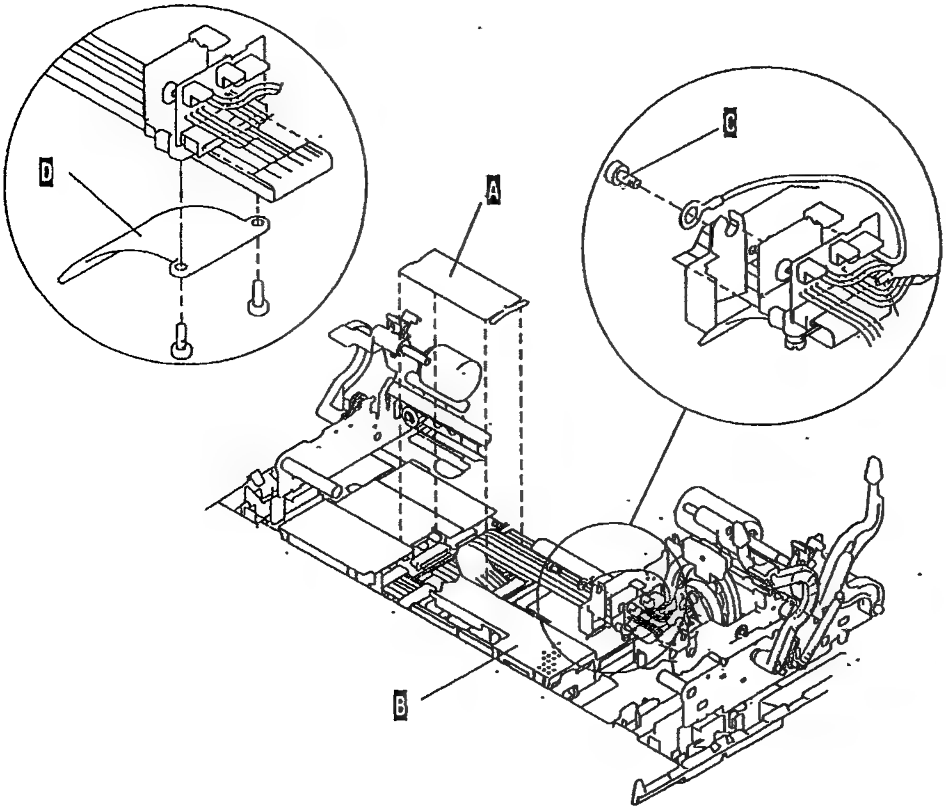
# Removal Procedures

## Carrier Assembly Removal

1. Remove the center cover.
2. Roll the transport belt from its pulleys. Do not use tools to do this.
3. Remove the folded part of the carrier cable from the electronic board cover. See page 3-12.
4. Disconnect the carrier cable from the function board/system board.
5. Remove the electronic board cover. See page 3-12.
6. Use a 1/4" wrench to rotate the carrier shaft about 1/8 turn top to rear to release it.
7. Push the shaft to the right far enough so it is away from the left side frame.
8. Lift and pull the left end of the carrier shaft to the front, then pull the shaft and carrier to the left to clear the right side frame.
9. Pull the carrier shaft out of the right side of the carrier.

## Carrier Cable Removal

1. Move the carrier to the right frame.
2. Remove the carrier cable clamp **A** from the top of the electronic board cover. See page 3-12.
3. Disconnect the carrier cable from the function board/system board.
4. Remove the electronic board cover **B**. See page 3-12.
5. Remove the mounting screw **C** that holds the carrier cable board clip to the carrier frame.
6. Remove the cable board from the clip.
7. Remove the carrier cable clamp **D** from the carrier cable.
8. Disconnect the carrier cable from the cable board.

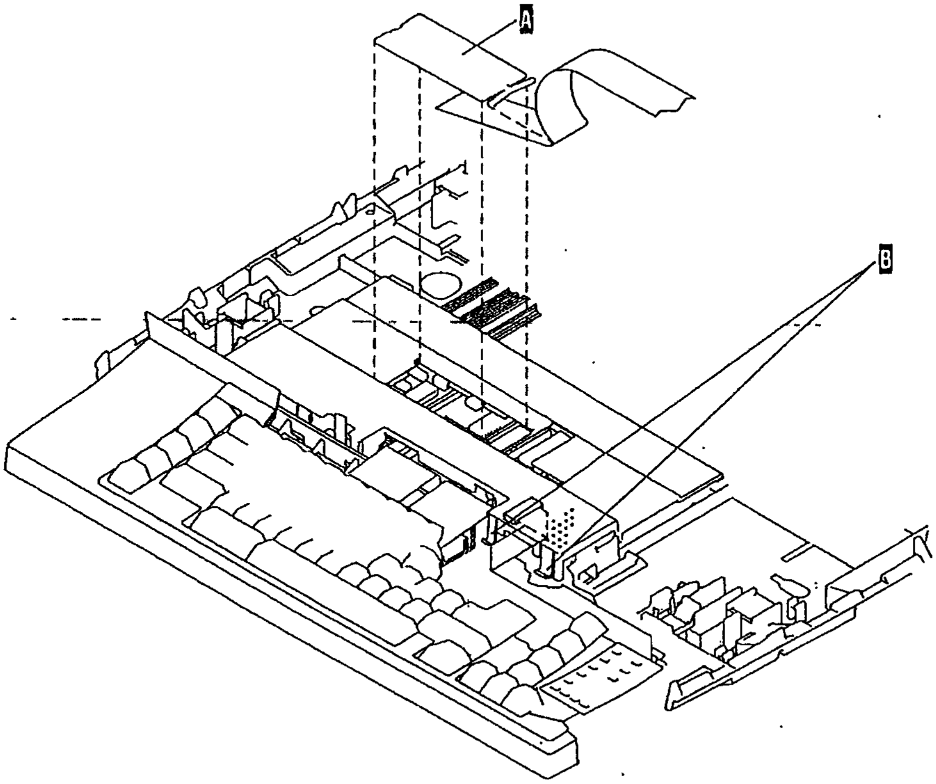


## Center Cover Removal

1. Remove the line cord.
2. Pivot the carrier pointer to the left.
3. Push the bottom end of the (4) cover latches in with a tool to release them.
4. Lift the cover up and to the front to remove it.

## Electronic Board Cover Removal

1. Move the carrier to the right side.
2. Turn the machine off.
3. Remove the top cover.
4. Remove the platen and deflector.
5. Remove the carrier cable clamp **A** from the top of the electronic board cover.
6. Disconnect the carrier cable.
7. Gently squeeze the front and rear of the electronic board cover to release the tabs **B** from the slots in the bottom cover. There are nine tabs.
8. Pivot the rear of the cover up and remove from the machine.



## Feed Roller Assembly Removal

1. Remove the:
   - Center Cover
   - Platen
   - Deflector
   - Move the carrier away from the assembly you want to remove.
   - Feed roller assembly retainer on non U.S. machines only.
2. Push down the feed roller assembly until the lower ends of the roller assemblies release from the transport bracket.
3. Rotate the feed roller assembly forward, then lift it out of the machine.

## Frame Assembly Removal

1. Remove the:
   - Center cover
   - Platen
   - Deflector
   - Feed roller assemblies
   - Carrier
   - Semi-automatic paper insertion (SAPI) switch
2. Disconnect the index motor cable from the index motor.
3. Disconnect the transport motor cable from the transport motor.
4. Disconnect the ground straps.
5. Release the front frame latches and lift the front of the frame and rest it on top of the frame latches.
6. Release the rear frame latches and lift the frame out of the bottom cover.
7. Remove the frame assembly.

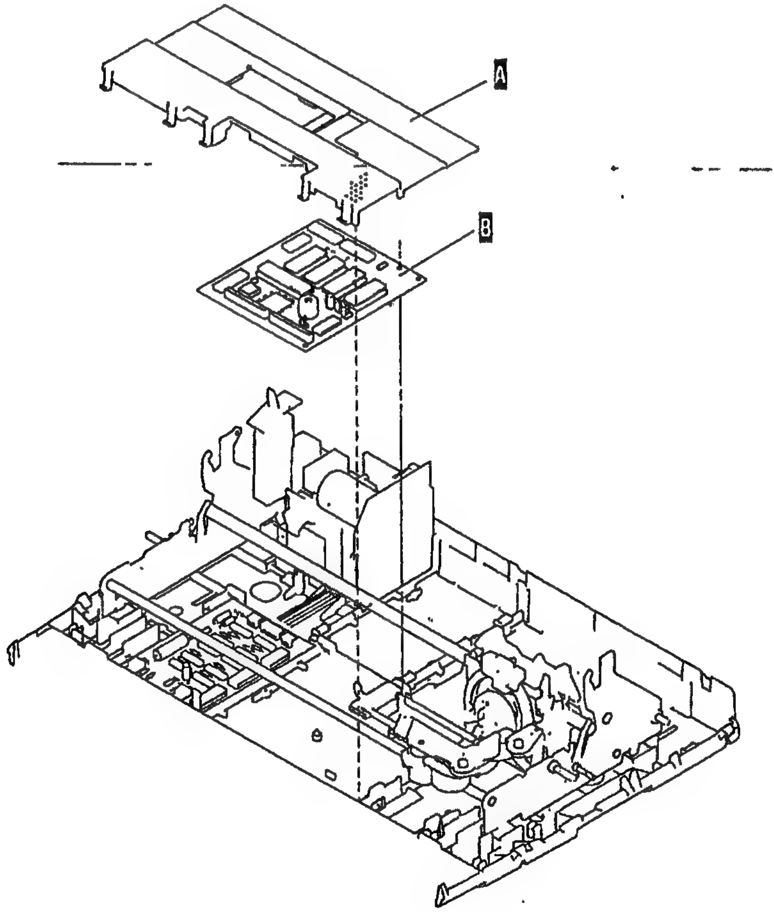
**Note:** When installing the frame, be careful not to trap any of the wires under the frame or in the frame latches.

## Function Board Removal

**Note:** Leave the battery connected to the function board if you remove the board from a machine, and then put it back into the machine. This will ensure that memory is not lost.

1. Turn the machine off.
2. Move the carrier to the right frame.
3. Carefully remove the carrier cable clamp from the electronic board cover. See page 3-12.
4. Disconnect the carrier cable.
5. Remove the electronic board cover **A**. See page 3-12.
6. *Do not disconnect the battery connector from the function board.* Disconnect all other cables from the function board.
7. Lift the function board from the machine **B**.

**CAUTION:**
**The carrier cable may easily be damaged if it is not installed correctly in the electronic board cover.**



## Homing LED Removal

1. Remove the carrier.
2. Disconnect the homing LED connector.
3. Remove the retainers that hold the LED cable to the carrier frame.
4. Remove the homing LED mounting screw.
5. Remove the homing LED.

## LED Indicator Panel Assembly Removal (WW10, 15, 1500, 3000)

1. Remove the center cover.
2. Move the carrier to the left frame.
3. Disconnect the indicator panel cable (J5) from the function board.
4. Pull the bottom of the 2 retainers on the rear of the keyboard cover to the rear to release the keyboard cover.
5. Lift the rear of the keyboard cover slightly, then slide it toward the front and away from the machine.
6. Unlatch the LED panel from the keyboard and remove it.

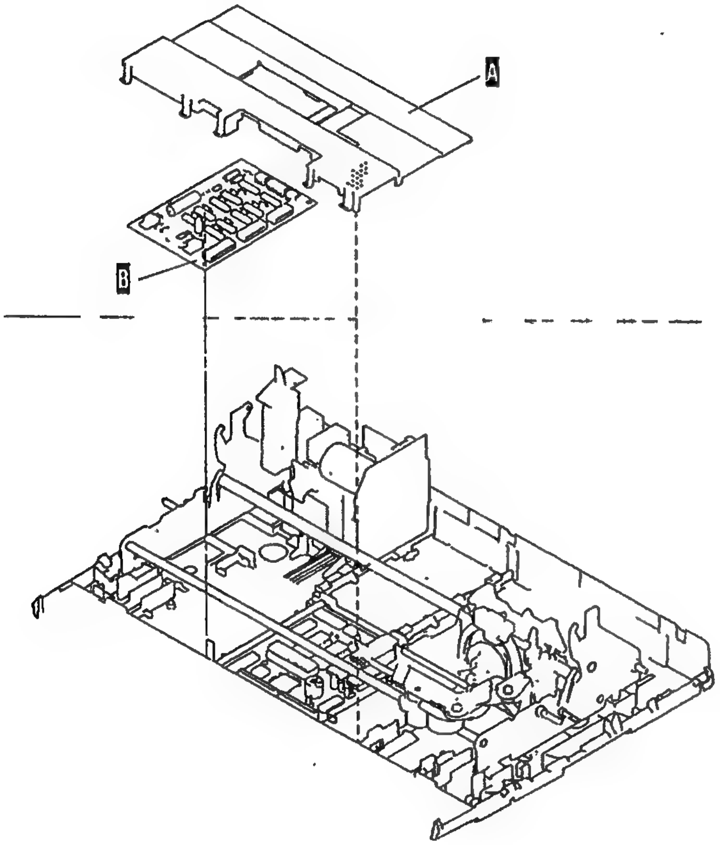
## Keyboard Removal

1. Remove the center cover.
2. Unlock the ZIF connectors (if applicable) and remove the keyboard connectors (J1, J2) from the function board.
3. (WW10, 15, 1500, 3000) Disconnect the indicator panel connector (J5) from the function board.
4. Pull the bottom of the 2 retainers on the rear of the keyboard cover toward the rear of the machine to release the keyboard cover.
5. Lift the rear of the keyboard cover slightly, then slide the cover toward the front and away from the machine.
6. Pivot the rear of the keyboard up and lift it out of the machine.

## Motor Control Board Removal

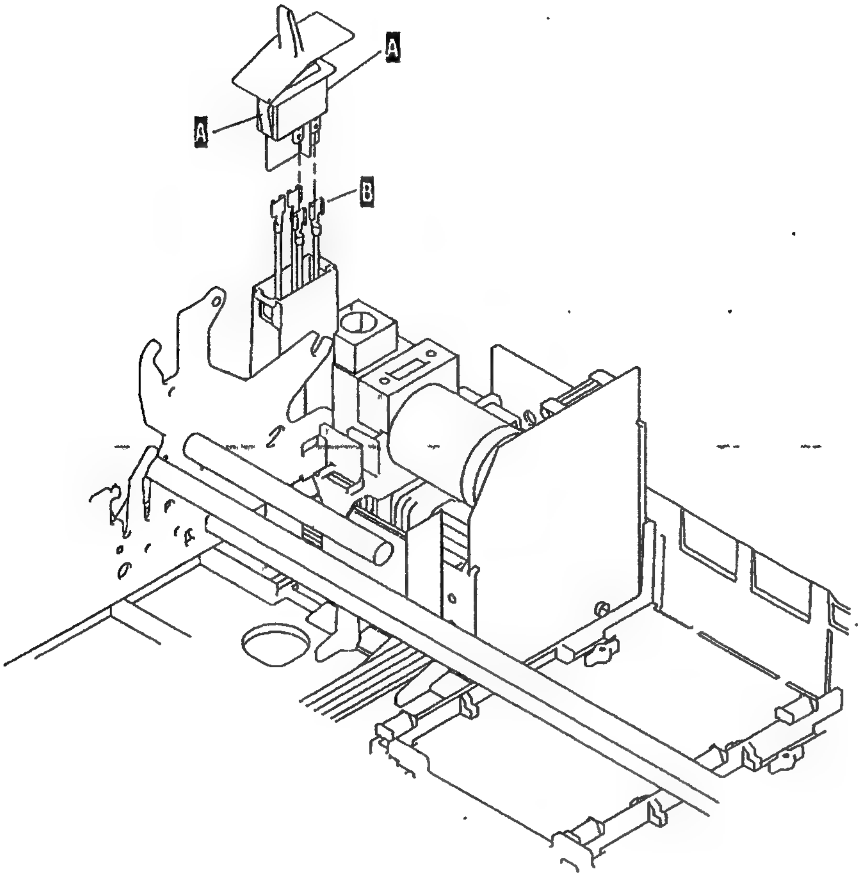
1. Turn the machine off.
2. Move the carrier to the right frame.
3. Carefully remove the carrier cable clamp from the electronic board cover. See page 3-12.
4. Remove the electronic board cover **A**. See page 3-12.
5. Disconnect all cables from the motor control board.
6. Lift the motor control board from the machine **B**.

**CAUTION:**
**The carrier cable may easily be damaged if it is not installed correctly in the electronic board cover.**



## On/Off Switch Assembly Removal

1. Disconnect the machine from the AC outlet.
2. Remove the center cover.
3. Push switch latches in **A** and lift the switch assembly up from the switch tower.
4. Disconnect the wires **B**.
5. Remove the switch.



## Paperfeed Motor Assembly Removal

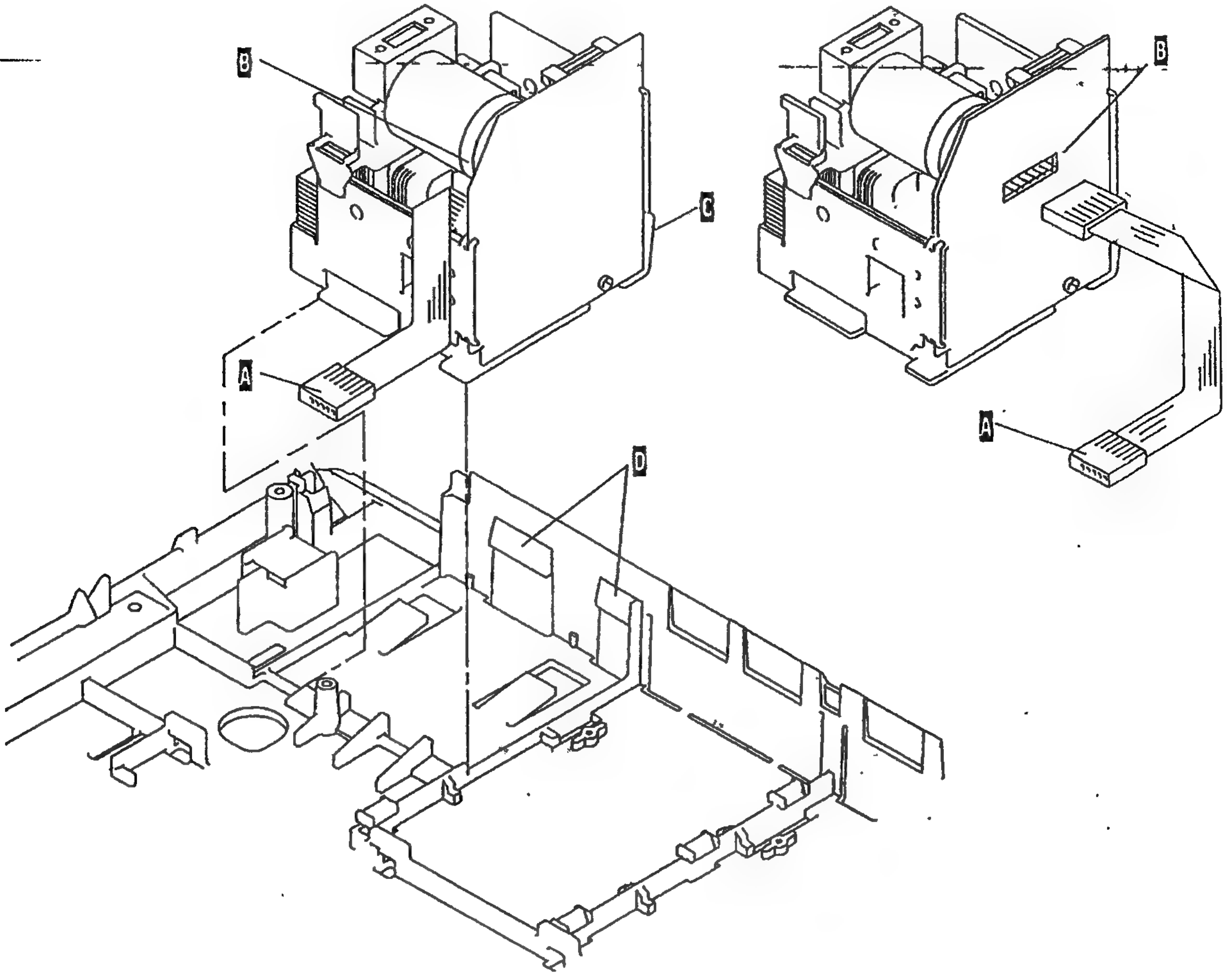
1. Remove the:
   - Top cover and Platen
   - Paperfeed motor tension spring
   - Two front paperfeed motor mounting screws.
2. Disconnect the paperfeed motor cable from the paperfeed motor.
3. Move the paperfeed motor to the rear and lift it out of the machine.

## Power Supply Removal

1. Disconnect the machine from the AC outlet.
2. Remove the center cover.
3. Remove the carrier cable clamp from the electronic board cover. See page 3-12.
4. Disconnect the carrier cable from the motor control board.
5. Remove the electronic board cover. See page 3-12.
6. Disconnect the power supply connector **A** from the motor control board or function board.
7. If anything is connected to J2 **B** on the power supply board, disconnect it.
8. Remove the two on/off switch tower mounting screws.
9. Insert a screwdriver blade through the slot in the bottom cover. Place the blade between the power supply latch **C** and the latching surface of the bottom cover **D**. Gently pry the bottom cover away from the power supply latch.
10. Lift the power supply out of the machine.

    **Note:** You may need to remove the platen, deflector, and left feed roller assembly in order to pivot the power supply toward the front of the machine.

11. Before you install the new assembly, remove the grounding strap from the left-rear transformer mounting screw and install it at the right-rear mounting screw.

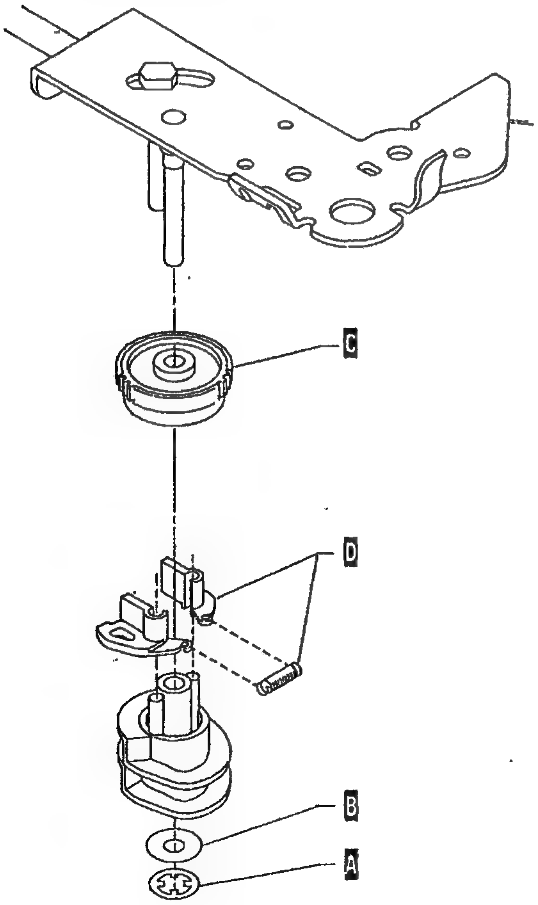


## Ribbon Lift Cam Removal

1. Remove the carrier.
2. Remove the ribbon plate from the carrier. Be careful not to lose the cam follower roller.
3. Remove the retainer from the bottom of the ribbon lift cam mounting shaft **A**. Do not try to lift the retainer straight off the shaft. Carefully pry the retainer extensions away from the shaft and lift. When you reassemble the lift cam, use a new retainer.
4. Hold the ribbon feed gear and lift the entire assembly up. A washer **B** on the top side of the gear may fall out. Place it aside.
5. Turn the assembly over and lift off the gear **C**.
6. Remove the pawls and pawl spring if necessary **D**.

To assemble:

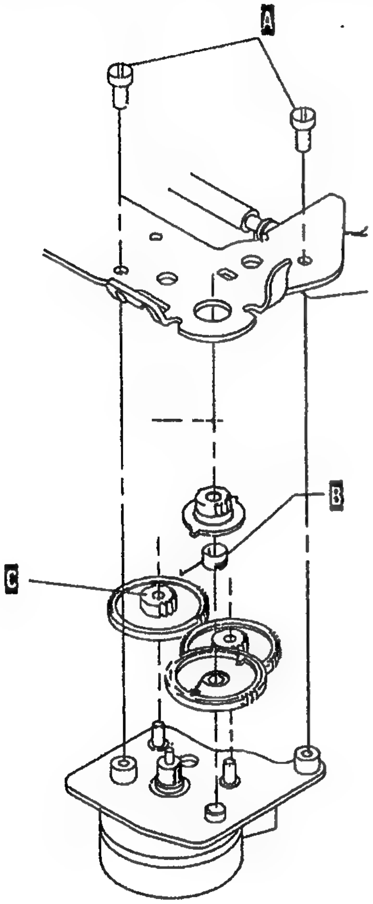
1. Place the pawls on the cam. The black pawl goes on the post near the step in the cam. Connect the spring if necessary.
2. Place the ribbon feed gear on the cam.
3. Hold the assembly and carefully lower it on the mounting shaft. You may have to tap the side of the pawls and cam to move them into place on the shaft.
4. Install the retainer and make the ribbon lift cam end-play adjustment on page 3-7.



## Ribbon Motor Removal

1. Remove the two motor mounting screws **A**.
2. The ribbon feed gear bias spring **B** is under tension and may fall out of the gears. Carefully remove the feed motor assembly from the ribbon plate.

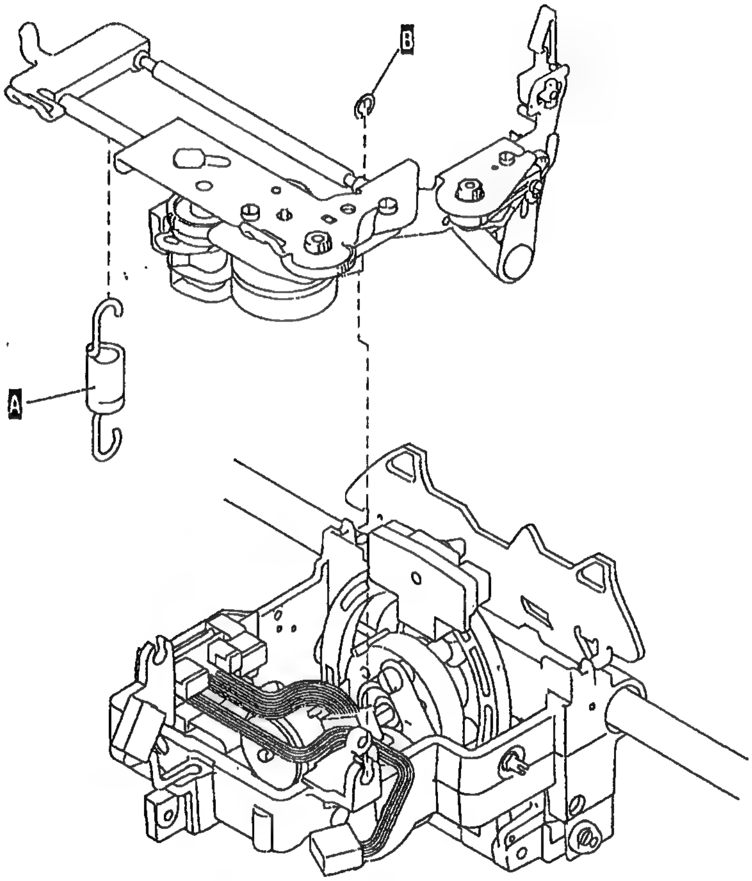
**Note:** When you install the ribbon feed motor, the idler gears must be installed with the small gear **C** on top. You must also make the ribbon feed gear bias spring adjustment on page 3-8.



## Ribbon Plate Removal

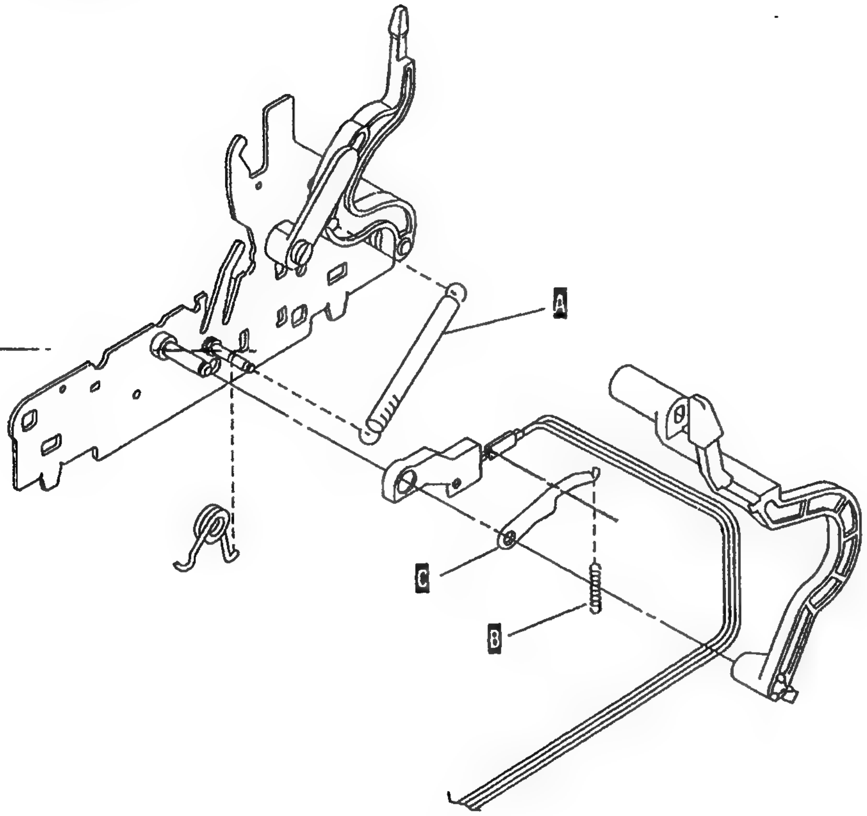
1. Remove the ribbon and correcting tape.
2. Remove the ribbon plate load spring **A**.
3. Note the direction of the high point on the C-clip **B**, then remove it from the pivot shaft.
4. Slide the ribbon plate to the right until you can lift it off the carrier.
5. Disconnect the ribbon feed motor connector.

**Note:** Check the ribbon lift adjustment on page 3-5 after you install the ribbon plate.



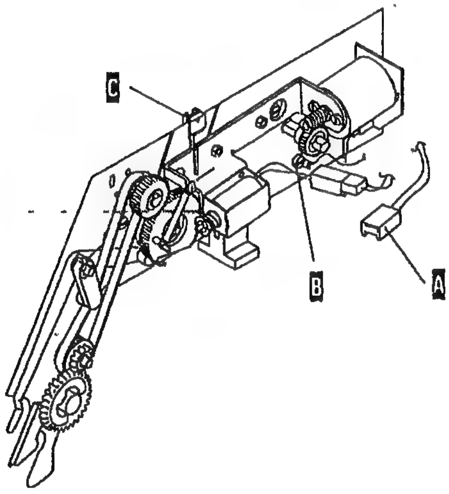
## SAPI Switch Removal

1. Remove the center cover.
2. Disconnect the SAPI cable from the SAPI switch.
3. Carefully remove the paper bail spring.
4. Remove the paper release lever spring **A**.
5. Disconnect the SAPI switch shunt arm spring **B**.
6. Remove the paper bail arm.
7. Remove the shunt arm **C**.
8. Remove the SAPI switch.

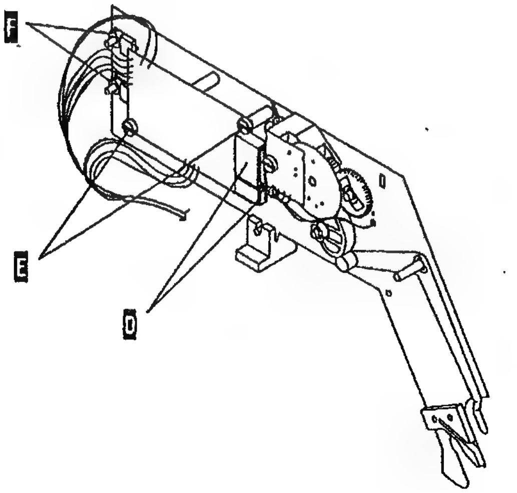


## Sheetfeed Logic Board/Power Cable Removal

1. Turn the machine off.
2. Disconnect the sheetfeed power cable from the typewriter.
3. Remove the sheetfeed from the typewriter.
4. Remove the left side cover from the sheetfeed.
5. Remove the right side cover and disconnect the bin selector switch cable **A** from the power cable.
6. Slide the bottom cover to the rear and remove it.
7. Remove the screw **B** holding the logic board/power cable assembly ground terminal to the right frame.
8. Remove the power cable assembly from the cable clamp on the rear of the sheetfeed.
9. Remove the envelope connector **C** from the right side frame.
10. Disconnect the motor and solenoid connectors.
11. Remove the cable from the cable clamps on the right side frame.

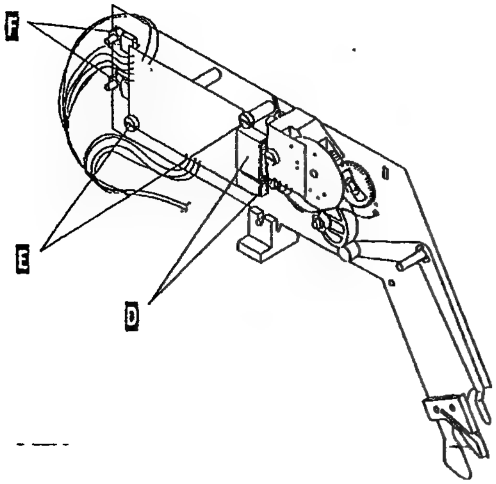


12. Disconnect sensor connectors J1 and J2 **D** from the logic board.
13. Remove the two screws **E** that mount the logic board to the left side frame.
14. Carefully remove the nuts **F** that mount the voltage regulator modules to the left side frame.
15. Remove the logic board/power cable from the sheetfeed.

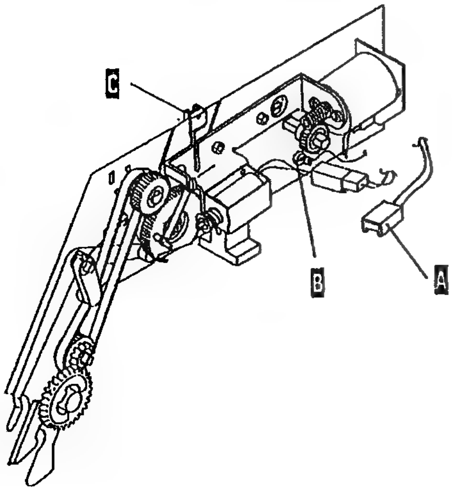


## Sheetfeed Logic Board/Power Cable Installation

1. Place the regulator module tabs over the screws studs and mount the logic board to the two standoffs **E** on the left side frame.
2. Install the regulator modules to the left side frame. be careful not to over-tighten the nuts **F** against the regulator modules.
3. Connect sensor connectors J1 and J2 **D** to the logic board.



4. Route the power cable assembly through the cable clamp on the rear of the sheetfeed.
5. Mount the logic board/power cable assembly ground terminal **B** to the right side frame.
6. Connect the motor and solenoid connectors.
7. Mount the envelope feed connector **C** to the right side frame.
8. Route the cable through the cable clamps on the right side frame.
9. Install the bottom cover.
10. Connect the bin selector switch cable **A** to the power cable assembly and install the right side cover.
11. Install the left side cover.
12. Install the sheetfeed onto the typewriter.
13. Connect the sheetfeed power cable to the typewriter.



## Selection Plate Assembly Removal

1. Remove the printwheel, ribbon, and the correcting tape.
2. Disconnect the two selection plate load springs.
3. Remove the carrier.
4. Disconnect the hammer solenoid and selection motor connectors.
5. Disconnect the homing sensor cable from the homing sensor.

   **Note:** Mark the position of the eccentrics. Also notice that the eccentric for the left side has the longest shoulder. Remember to check the Even Top And Bottom Printing Adjustment, page 3-3, when you install the eccentrics.

6. Remove the 2 selection plate eccentrics.
7. Remove the selection plate through the bottom of the carrier.

**Note:** A replacement selection plate assembly contains a print hammer solenoid with 2 shims. You may remove 1 shim to adjust for gray impression. Put the removed shim back on the solenoid if removing it causes partial lift off. Do not remove shims from other than new replacement selection plate assemblies.

## Transport Motor Removal

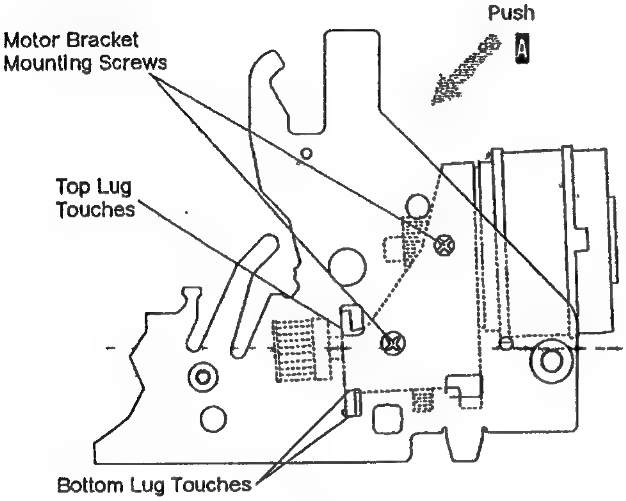
1. Remove the center cover.
2. Disconnect the transport motor cable from the transport-motor.
3. Grasp the motor and turn it to release the motor tabs from the bracket.

## Transport Assembly Removal

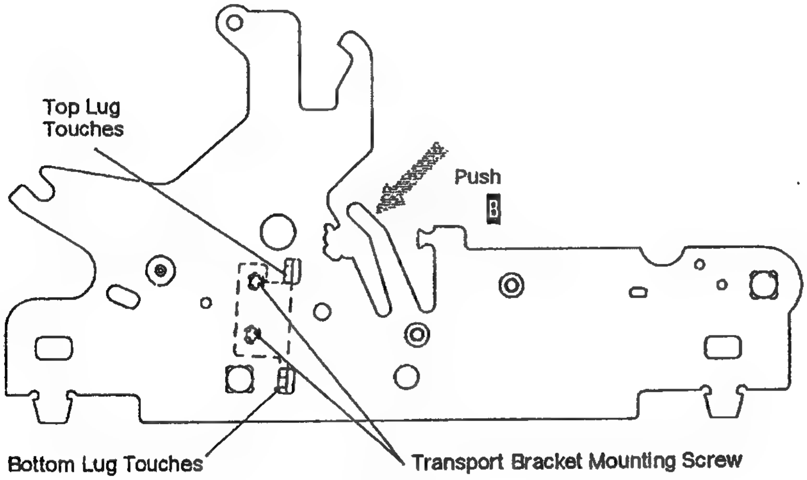
1. Remove the:
   - Top cover
   - Keyboard cover
   - Carrier.
2. Remove the transport belt from the carrier.
3. Remove the transport motor.
4. Remove the two idler pulley bracket mounting screws.
5. Remove the transport belt adjusting screw.
6. Remove the shipping retainer from the new transport motor bracket.
7. See the transport bracket installation, page 3-26.
8. Check the transport belt adjustment, page 3-9.

## Transport Bracket Installation

1. Position the right hand end of the transport bracket in the side frame **A** to meet two conditions:
   a. Down so the bottom lug touches the bottom of the hole in the side frame,
   b. Forward so the top and bottom lugs touch the front of the holes in the side frame.
2. Tighten the two motor bracket mounting screws.
3. Position the left end of the transport bracket in the side frame **B** to meet two conditions:
   a. Down so the bottom lug touches the bottom of the hole in the side frame,
   b. To the rear so the top and bottom lugs touch the rear of the holes in the side frame.
4. Tighten all the transport bracket mounting screws.



(Right Side View)



(Left Side View)

## Handling ESD-Sensitive Parts

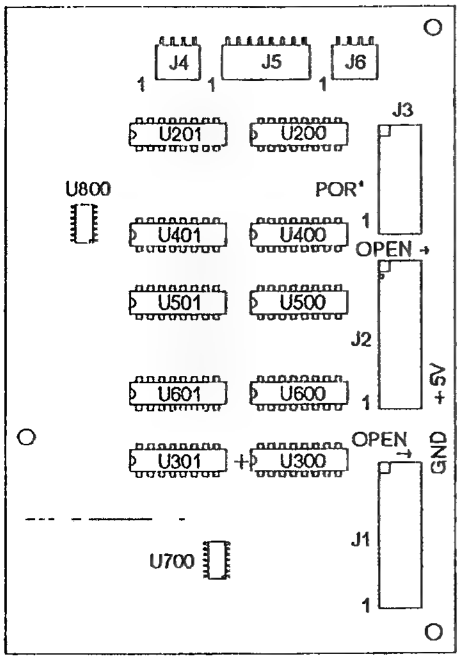
Many products use parts that are known to be sensitive to electrostatic discharge (ESD). To prevent damage when you work with ESD-sensitive parts, observe the following instructions; do these in addition to all the usual precautions such as switching off power before removing logic cards.

- Keep the ESD-sensitive part in its original shipping container (a special "ESD bag") until you are ready to install the part into the machine.
- Make the least possible movements with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.
- Put the ESD wrist strap on your wrist. Ensure the machine is turned off. Connect the wrist band to the keyboard ground wire (level 1) or the printer board bracket (level 2). This discharges any static electricity in your body to the machine.
- Hold the ESD-sensitive part by its edge connector shroud (cover); *do not touch its pins.* If you are removing a pluggable module, use the correct tool.
- Do not place the ESD-sensitive part on the machine cover or on a metal table; if you need to put down the ESD-sensitive part for any reason, first put it into its special bag.

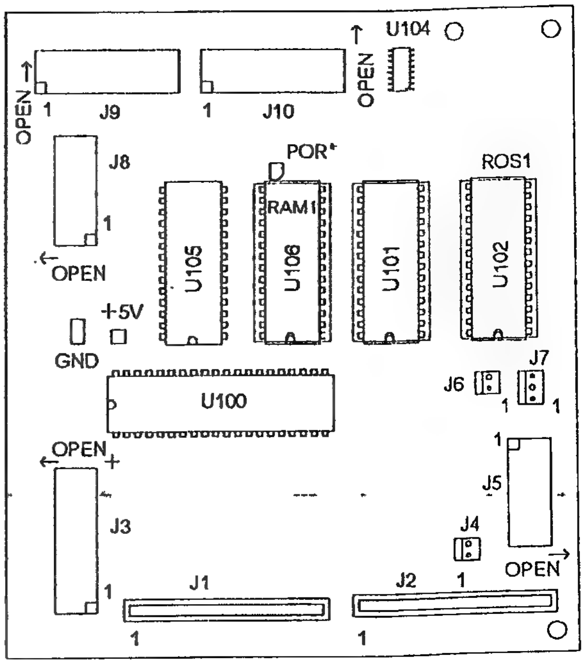
  Machine covers and metal tables are electrical grounds. They increase the risk of damage because they make a discharge path from your body through the ESD-sensitive part. (Large metal objects can be discharge paths without being grounded.)
- Prevent ESD-sensitive parts from being accidentally touched by other personnel such as CSRs or customers. Reinstall machine covers when you are not working on the machine, and do not put unprotected ESD-sensitive parts on a table.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).
- Be extra careful in working with ESD-sensitive parts when cold-weather heating is used because low humidity increases static electricity.

# Parts/Test Point Locations

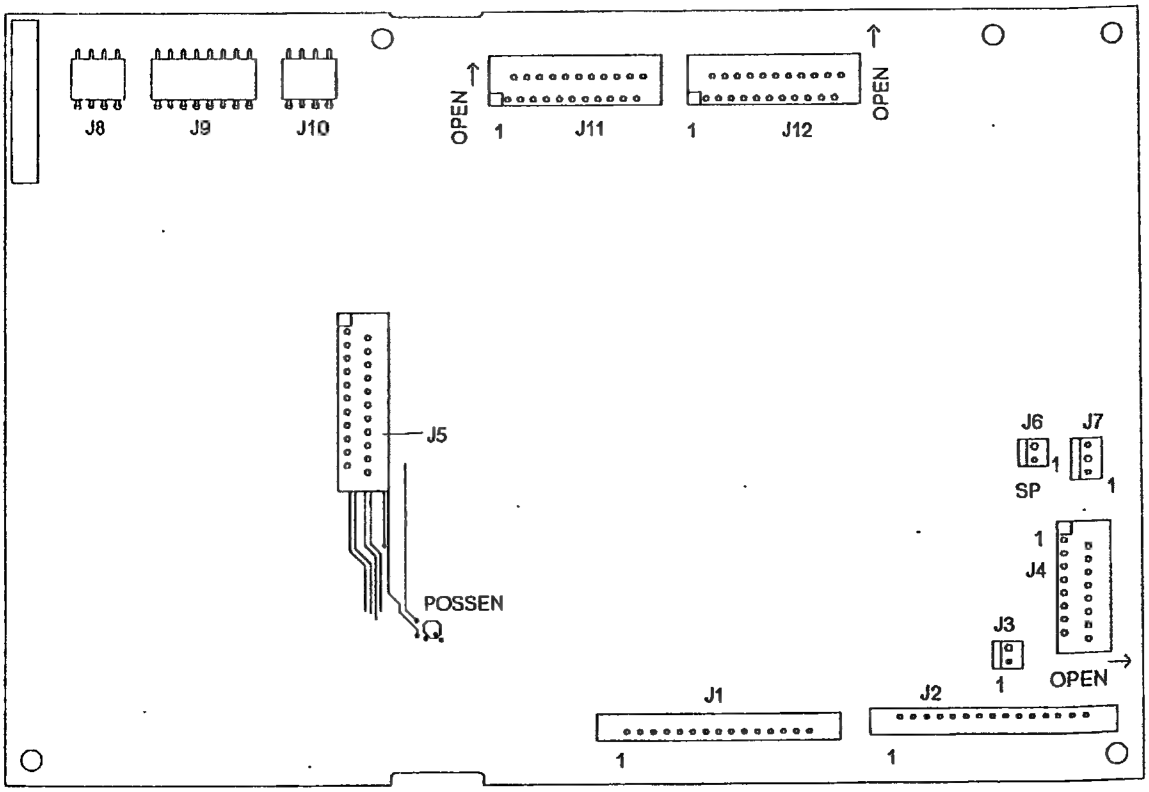
**Motor Control Board, Wheelwriter 10, 30, 50, 70**



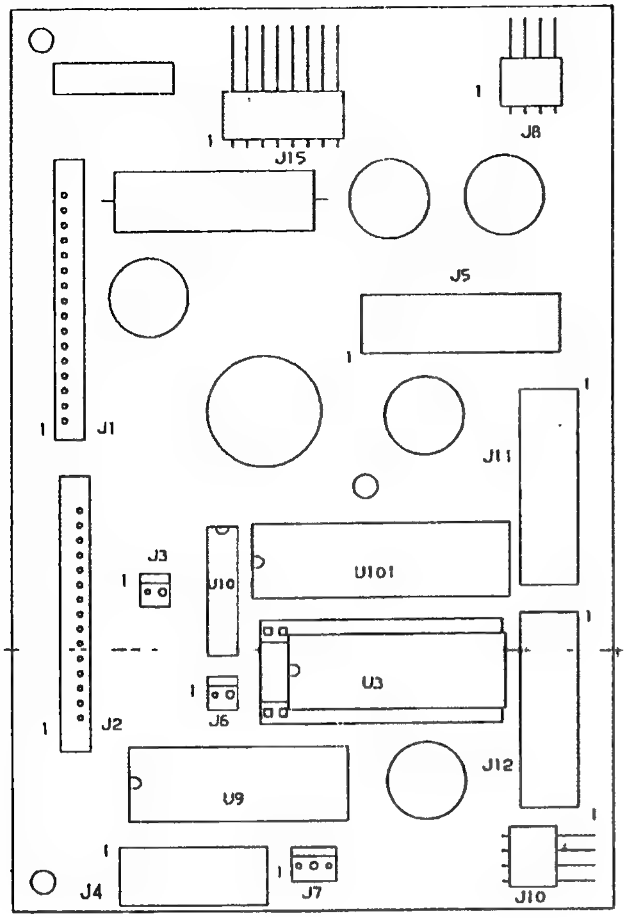
**Function Board, Wheelwriter 10 Typewriter (Two Board Version)**



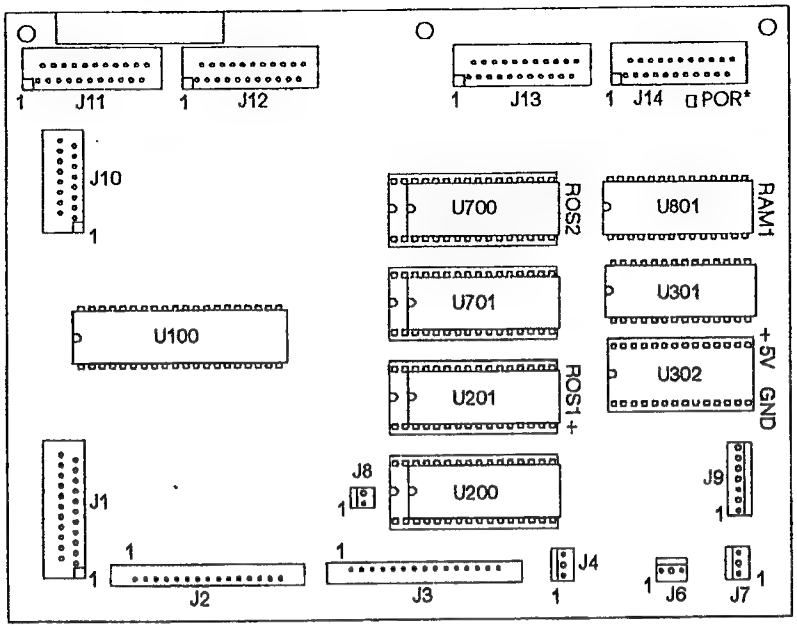
**System Board, Wheelwriter 10 Typewriter (Single Board Version, SMT Level 1)**



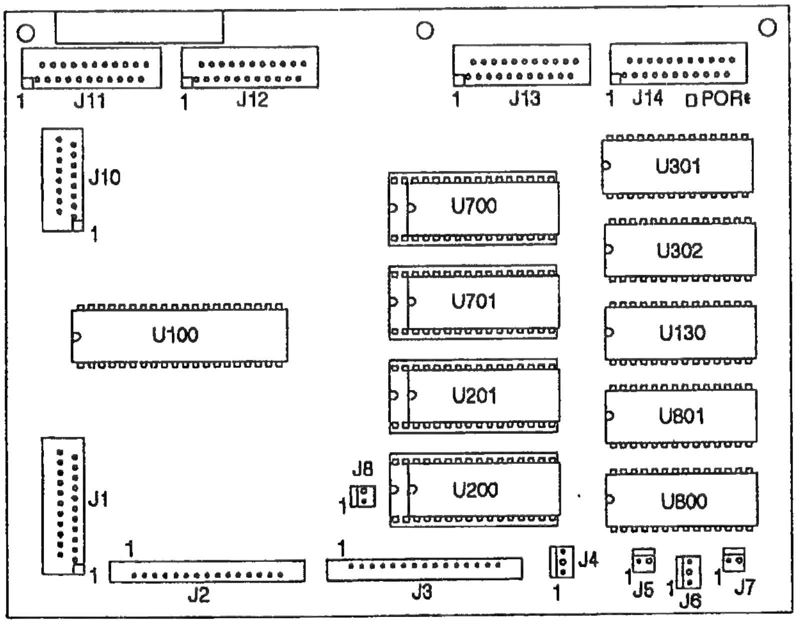
## System Board, Wheelwriter 10, 15 Typewriter (Single Board Version, DCA)



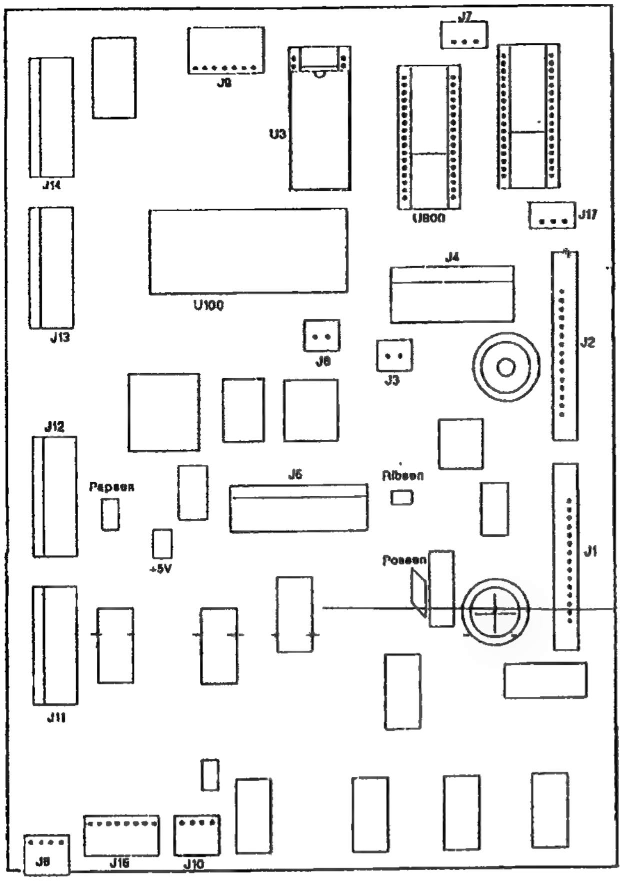
## Function Board, WW30, WW50 (Two Board Version)



## Function Board, WW70 (Two Board Version)

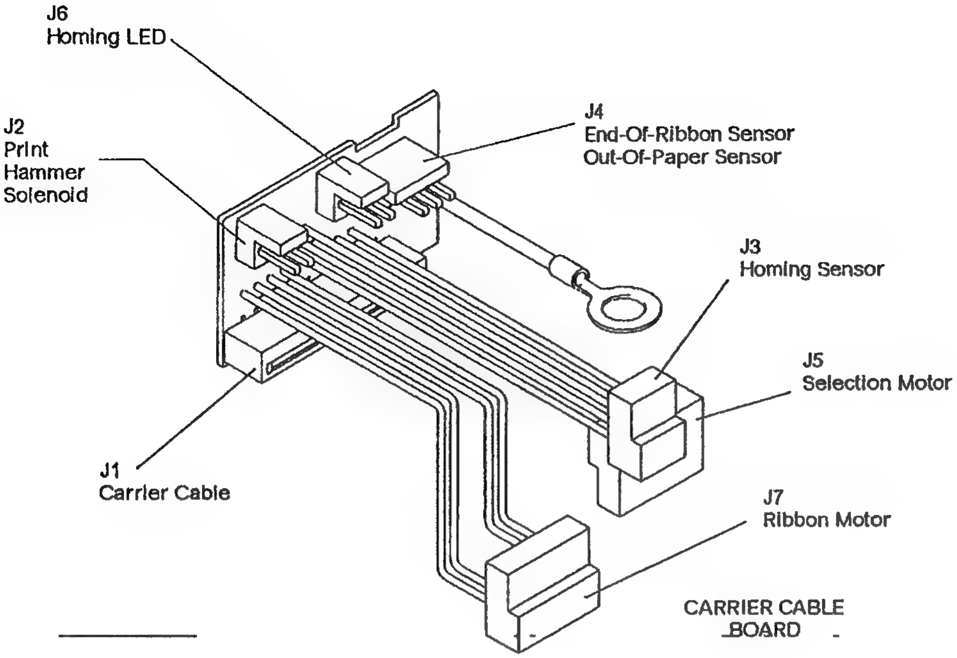


### Function Board, Wheelwriter (All Models Level 2)

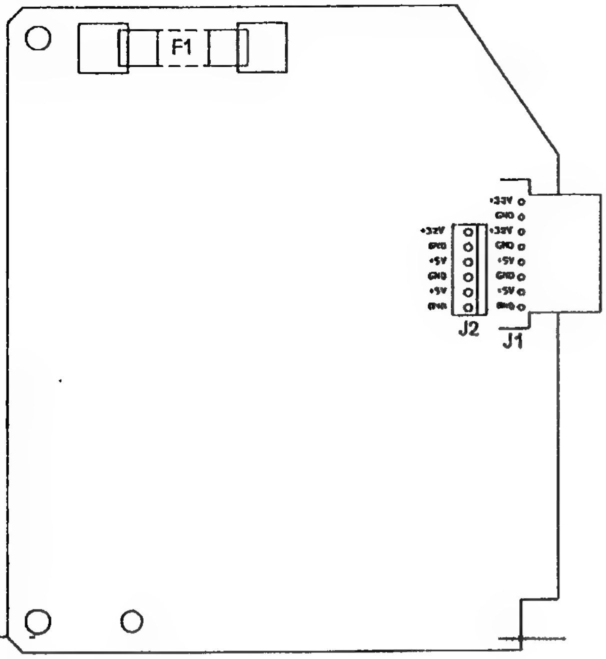


**Note:** Depending on the machine type and country, some connectors and components may not be present.

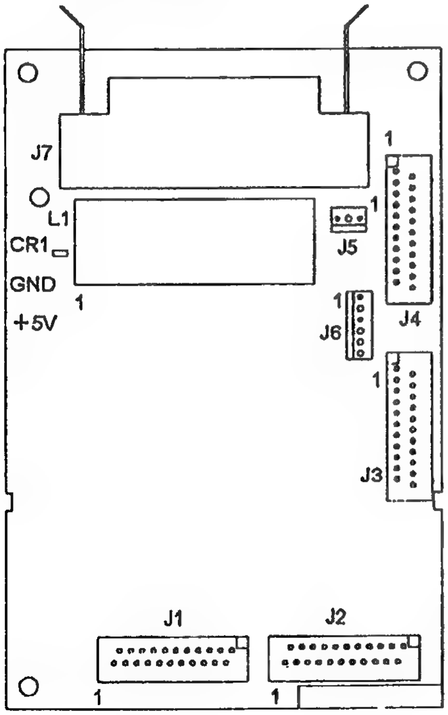
## Carrier Cable Board



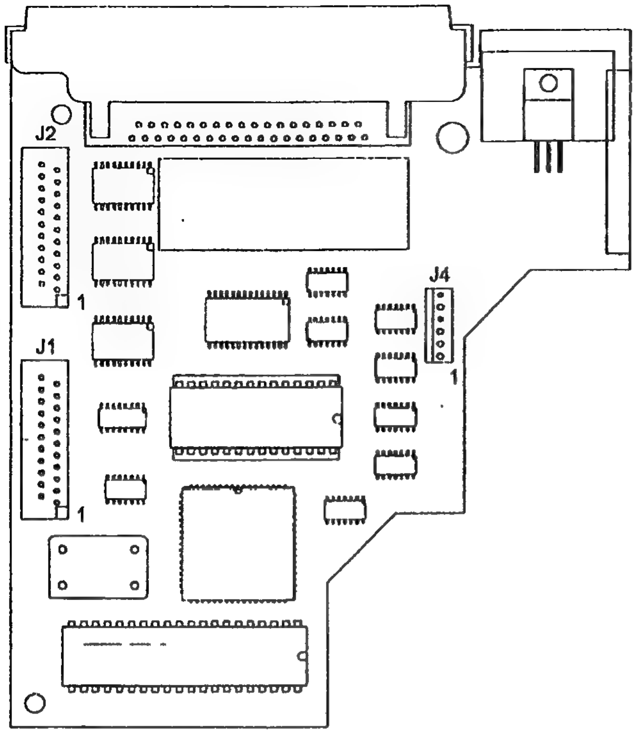
**Power Supply (Universal power supply does not have F1 fuse.)**



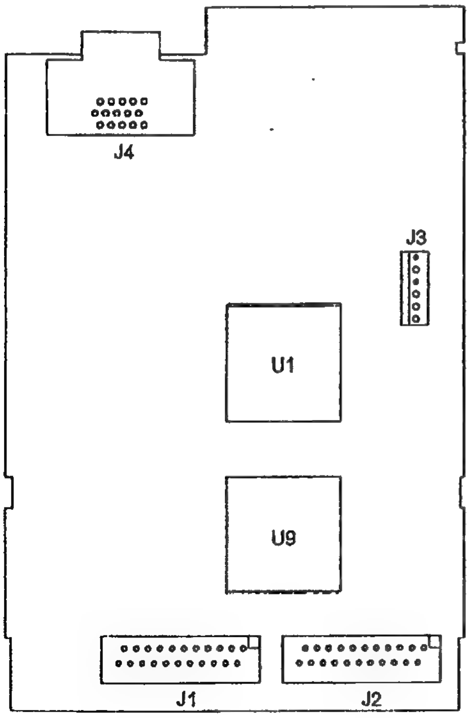
**Printer Option Board**



## Diskette Control Board



## CRT Display Control Board



# Preventive Maintenance

**Lubrication Guide**

**CAUTION:**
**Cleaning fluids will damage the typewriter covers.**

| Part | Lubricant |
|---|---|
| Carrier rail wipers | No. 10 |
| Deflector brackets (transport brkt. contact area) | No. 23 |
| Feed ratchet stud contacting bracket | No. 10 |
| Homing LED area | Do not lubricate |
| Paperfeed motor | |
| - Gear | No. 23 |
| - Idler plate (contact surface) | No. 23 |
| - Mounting plate (contact surface) | No. 23 |
| - Mounting studs | No. 10 |
| Paperfeed roller shafts (pivot points) | No. 23 |
| Paperfeed roller tension spring | |
| - Where it contacts feed roller bracket | No. 23 |
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# Safety Inspection Guide

**General Guidelines**

The purpose of this safety inspection guide is to aid you in identifying possible unsafe conditions on machines that are being inspected for a Maintenance Agreement. Each machine has needed items installed to provide the operators and service personnel with an acceptable level of safety. This guide lists only these items. Good judgment should be used to identify possible safety conditions not covered by this safety inspection guide.

If any unsafe conditions are present, you must find out how serious the hazard could be and if you can continue before you correct the hazard.

A copy of current Service Memorandums (SMs), ECAs (Engineering Change Announcements), and Feature/Model changes, along with the machine history, should be reviewed.

Check the following items:

- Damaged, missing, or changed parts, especially in the area of the on/off switch and the power supply.
- Damaged, missing, or changed covers, especially in the area of the top cover and the power supply.
- Possible safety exposure from any non-IBM attachments.

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